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ADDRESS.

CHAIRMAN'S ADDRESS.

Presented to the Section on Obstetrics and Diseases of Women, at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, June 1-4, 1897.

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This semi-centennial meeting of the ASSOCIATION is without doubt the most important epoch in its history and forcibly reminds each member of the fact that whatever doctrines may at this time be presented, they will be taken as rules and guides until future events shall have proved them false.

That the teachings to be promulgated during this session of our Section will tend to make this occasion most memorable there can be no doubt. The universally recognized reputations of the authors, and the titles of their papers, make it certain that there will not be any lack of interest in our Section work.

If it be true, and we claim it is, that the happiness and usefulness of the present generation and the perpetuity of vigorous future generations depend upon healthy mothers more than all other elements, then certainly it must be important to give our best thought and labor along the line of greater attainments in preventing diseases peculiar to them and the cure of those suffering from the numerous ailments so common to the female sex.

On this auspicious occasion it seems fitting to occupy a brief moment in reviewing some of the work which has been accomplished during the last half-century by way of a more accurate comprehension of the etiology, pathology and treatment of diseases of women by our American profession, largely in connection with the history of the AMERICAN MEDICAL ASSOCIATION. To do more than to refer to some of the prominent members of the profession and the work they have accomplished is quite out of the question in the time allotted. This résumé must therefore be disjointed and probably disappointing to those who would wish a longer and more exhaustive dissertation.

The organization of the AMERICAN MEDICAL ASSOCIATION occurred at a most propitious time. As great men are always to be found for great emergencies, so this organization was launched just at the beginning of the great awakening of the members of our profession to the possibilities of more extensive fields of usefulness.

In 1847 the very common, and we may say almost simple, operation of ovariotomy had been done less than forty times in America and the mortality, the result of these operations, was over 50 per cent.

The first recorded paper on fibroid tumors of the uterus presented to this ASSOCIATION was read by Dr. W. L. Atlee in 1853. Nothing definite regarding the surgical treatment of these growths was recommended, but the value of ergot was highly commended by the author. The records of the progress of gynecology in America show fully as much advancement as those of the older countries, but nothing of special merit is recorded on these subjects until fully a half-century after McDowell's first ovariotomy.

The inventive genius and consummate skill of the father of American gynecology, Dr. J. Marion Sims, began to be recognized by the profession in the early days of this ASSOCIATION's history, and the wondrous results of the work performed of this great and good man will continue to bless womankind to the end of the world.

Following closely in his footsteps came Dr. Thomas Addis Emmett, whose teachings and operative skill have tended to enrich the science of gynecology second only to Sims, and he still lives to give us wise counsel and valuable assistance in relieving suffering women. Sims and Emmett may truly be styled the pioneers of American gynecology. The great work accomplished by these two specialists entitles them to the highest encomiums possible to be bestowed by the profession. Imbued with the impetus given by Dr. Sims to gynecology, this great specialty was promptly and enthusiastically taken up by Drs. Emmett, H. R. Stover, Nathan Bozemann, E. R. Peaslee, T. Gaillard Thomas, James P. White, W. H. Byford, Robert Battey and scores of others of whose records the profession has just cause to be proud. Dr. T. Addis Emmett's contributions regarding the subject of laceration of the cervix uteri, the etiology of the affection, its symptoms, the effects on the constitution and the operation for its relief are too universally known to require special mention in this connection. Dr. Peaslee, in 1854, contributed a paper on the treatment of septicemia following ovariotomy, in which he recommended the introduction of a tube into the peritoneal cavity, through which the serous sac was irrigated. Time has proved the wisdom of this method of treatment for this grave condition.

In 1856 Dr. J. P. White of Buffalo reported the successful reduction by taxis of an inverted uterus of eight days' standing. He was the first successful operator in this country to reduce a chronic inverted uterus.

In 1868 Dr. Emmett reported that he had retained partial reposition of the uterus by closing the os externum with silver sutures.

Prior to 1862 but one case of pelvic hematocele had been published. That year three essays on the subject were written, respectively, by John Byrne of Brooklyn, Fordyce Barker and E. Noeggerath of New York.

Dr. Shupper of New Orleans gave the profession, in 1866, an exhaustive treatise on vesico-vaginal fistula.

Dr. Theophilus Parvin operated in 1867 for uretro-vaginal fistula by turning the displaced distal extremity of the ureter into the bladder and then closing the

vaginal opening. The operation was successful and original with Dr. Parvin.

The removal of a small ovarian cyst through the cul-de-sac of Douglas was first done by Dr. T. G. Thomas, in 1870.

Dr. Robert Battey of Georgia reported in 1870 a case of extirpation of the ovaries for the relief of dysmenorrhea, the result of which was satisfactory. His name has been made immortal through his acumen in selecting suitable cases and performing what he termed normal ovariotomy.

In 1873 Dr. John Ball of Brooklyn recommended the rapid dilatation of the cervix uteri for constrictures and irregularities of the canal from flexions and versions. Dr. William Goodell of Philadelphia invented a valuable instrument for uterine dilatation and successfully performed a great number of these operations.

One of the greatest advancements in modern gynecology was Dr. Emmett's contribution, in 1874, on the pathology and treatment of diseases of the neck of the uterus.

In 1874 Dr. Sims contributed a valuable paper on the enucleation of intra-uterine fibroids. The same year Dr. Byford of Chicago read a paper on the treatment of uterine fibroids by ergot. Dr. Byford was the first to advocate the use of this drug in very large doses to cause expulsion in addition to atrophy.

In 1874 Dr. Alexander Skene performed successfully to both mother and child, the operation of laparoelytrotomy. The operation has been done only a few times, with a mortality of about 50 per cent.

Dr. Fordyce Barker of New York, and Dr. H. R. Stover of Boston, were the first American surgeons to call the attention of the profession to the causative relations of uterine and ovarian disease to mental disturbances in women. The former published an article upon this subject in 1872, and the latter a monograph upon the same subject in 1871.

Dr. George J. Engelmann, in 1877, gave the profession a collection of facts concerning hysteroneurosis of the brain, pharynx, larynx, eye, stomach, intestines, bronchi and joints of severe and misleading character, frequently produced by non-development of the uterus or ovaries, or both, or peri-uterine disease.

In 1882 Dr. Christian Fenger of Chicago recorded the first successful operation of kolpohysterectomy for uterine cancer, and at the same time advocated the operation as a justifiable one.

It is claimed that Dr. Charles K. Briddon performed the first celiotomy in 1883, after rupture of the fetal sac in tubal pregnancy.

Dr. Matthew D. Mann was the first to publish a successful operation performed in February, 1883, in which he removed a small subperitoneal fibroid tumor of the uterus through the anterior wall of the vagina.

Dr. Burnham was the first American gynecologist to perform successfully supravaginal hysterectomy. This was in 1853. Dr. Stover and Dr. Kimball were among the first to boldly operate for large fibroids of the uterus.

In 1884 Dr. R. S. Sutton did the first celiotomy for pelvic abscess.

Dr. T. G. Thomas performed the first systematic vaginal ovariotomy in February, 1870. Dr. Robert Battey performed the operation first in 1874, and in 1877 successful cases were reported by Drs. Gilmore of Mobile, Clifton E. Wing of Boston and William Goodell of Philadelphia.

To Dr. Robert Newman of New York is given the credit of being the veteran advocate in America of the electrolytic treatment of fibroids of the uterus, thirty years ago.

The first journal devoted to obstetrics and gynecology appeared in 1868, edited by Dr. B. F. Dawson. The specialty of gynecology was not recognized exclusively by any medical journal until 1869, when the *Journal of the Gynecological Society of Boston* was published and edited by Drs. H. R. Storer, G. H. Bixby and W. Lewis.

The first book published on diseases of women after the organization of the AMERICAN MEDICAL ASSOCIATION was by Dr. C. D. Meigs, and although it ran through several editions, it would be considered a "back number" if compared with the present status of gynecology.

Obstetric societies were formed many years ago in some of the large cities, but the first gynecologic society organized was the Gynecological Society of Boston in 1869. Where obstetric societies existed gynecology shared with obstetrics in the attention which was devoted to it.

In 1870 the AMERICAN MEDICAL ASSOCIATION passed resolutions recommending that the establishment of chairs of gynecology, separate from obstetrics, be more generally adopted by medical colleges and schools throughout the country. To this great organization, therefore, credit must be given for this timely and important step along the line of greater attainments in this, the most important branch of medicine and surgery.

As early as 1871 there were thirteen medical colleges in the United States in which were full professorships of gynecology and obstetrics. Of this number there were seven schools with full professorships of diseases of women, incumbents teaching nothing else. At the present time every fully equipped medical school has a professor of gynecology whose lectures are devoted exclusively to diseases of women.[1]

A comprehensive review of the progress of obstetrics and gynecology in America during the past fifty years would require too much of the time of the Section. Perhaps sufficient reference has been made to meet the requirements of this occasion.

The last decade has been a period of advancement without parallel in the world's history. It is not within the power of tongue or pen to fittingly present the good accomplished in preventing suffering and saving life, the results of the progress along these branches of the healing art. Today health is restored and life saved where, in like conditions, a few years ago, patients were doomed to suffer on until death summoned them to eternal rest.

In making mention of the recent progress in obstetrics and gynecology, very little can be added to the recorded facts presented by my distinguished predecessors. During the past year operative procedures have in some quarters of the globe and by a few members of the profession, been severely criticised, and instead, palliative measures recommended. Conservatism has been and always should be the watchword of surgeons; just what conservatism stands for, is the all important question. Is it conservatism to permit our patients to suffer and eke out a miserable life, when it is within our skill to restore them to health and happiness? Our mission is most clearly defined by the motto: *Strive to prevent sickness, learn to restore*

[1] Compiled from the "American System of Gynecology."

health, and delight in prolonging human life by such methods as have been found the safest and surest, regardless of any dogma presented to us by the unfortunate or inexperienced members of the profession, who would have us follow their ipse dixit on the pretext that surgery was never intended to take the place of medicine. The writer is not to be understood as deprecating the teachings of any individual along any special line, neither that medicine has not a field of usefulness in the management of some of the conditions which we are constantly called upon to treat. But the important proposition for our consideration is: What can be accomplished by the conservative plans of our predecessors, which compare favorably with the modern methods of gynecologists? The answer is obvious. While it is true that much harm has been done in the past few years by ambitious and enterprising gynecologists, at the same time were we to compute the awful results of the other class of the profession who would recommend that operative measures should never be resorted to until the suffering patient is about to depart this earth to that country from whose bourne no patient ever returns, then the members of the profession would change their verdict. Is it not entirely pertinent to call a halt, and ask ourselves the question: What is the occasion for this constant play to the galleries, on the part of some of our professional brethren?

The use of vaginal antiseptic douches prior to parturition, which a few years ago were thought essential, are now discarded by many prominent obstetricians, unless it is apparent that there are present septic micro-organisms. All are agreed that surgical cleanliness should be rigidly observed in all other particulars. Too much stress can not be put on the importance of preparing the patient's body, bedding and room, with as much care as is observed in abdominal surgery. After parturition the genitals should be protected by antiseptic dressings.

Symphysiotomy, which has been so ably supported by Dr. Robert P. Harris of Philadelphia and others, has not, so far as the writer has observed, materially grown in favor during the past year. Porro's operation can be performed with quite as much safety to the life of the mother and at the same time gives more certain promise of complete restoration to health. The relative merits of these procedures must be left to individual obstetricians. The use of obstetric forceps to bring down the head to the soft parts, meets the approbation of many of our most experienced practitioners in cases where there is too much delay in labor, and the parturient is becoming exhausted.

Many recent reported cases of gestation complicated by ovarian tumors and other abdominal growths, which have culminated safely to mothers and children, go to teach that nature is equal to great things, and that for these conditions operative procedures may often be postponed till after parturition.

The use of the sharp curette in the treatment of endometritis, either acute or chronic, is now recognized as meeting the gravest conditions so common after abortions, and septic infection during labor.

The merits of electricity in the treatment of pelvic exudates and some forms of fibroid growths are still urged by numerous enthusiasts, and their opinion should receive the unprejudiced consideration of those whose experience has not afforded them the opportunities enjoyed by those whose work is along this line. It may truthfully be said that electricity has been discarded by many who formerly had much faith in its efficacy in the treatment of fibroids. At the same time it is not possible to write a final verdict relative to the future of this element in medicine. It has done incalculable harm in the hands of an army of followers and, unless it can be used by those whose experience has been such that the dangers are reduced to a minimum, it had better be discarded altogether. If it were possible for the profession to comprehend the awful condition resulting from tinkering with this most powerful and therefore dangerous element, its employment would be relegated to those only who have given sufficient time to investigate and master the intricacies of its action. To arrive at the comparative benefits of electricity in the treatment of conditions which are considered amenable to its influence, one must be thoroughly experienced in all that goes to make a careful and conservative specialist. The thought is, no one can be in a position to give an unbiased opinion regarding the merits or demerits of any plan of treatment until opportunity has been afforded to carefully investigate other methods for like conditions. The surgeon who never did anything but surgery for pelvic exudates and fibroids, would not be in a position to pronounce eternal damnation on electricity, even though he is quite familiar with some of the harm that has been done by this method, for he can not anticipate in every case what the condition was prior to its use or what it might have been without it. Neither can the electrician comprehend what may have been accomplished by methods entirely different. This important problem must, then, be relegated to a careful, conscientious and unbiased investigation, and the verdict will be recorded in the future.

It is quite apparent that much of the sentimentality connected with operations for diseased uterine adnexa has given place to more sober investigation relative to the results after these operations. It has become a universally recognized fact that patients whose lives have been spent in suffering, causing them to be burdens to themselves and anxious cares to their friends, are now with only an occasional exception restored to health and happiness by the skilled operator. This being a recognized fact, what is the cause of the hue and cry of those whose experience is too limited to comprehend the wonderful boon to suffering women afforded by the physicians who are giving their lives to this noble work. It is unnecessary to rehash the trite statement that "operators have manifested too much enthusiasm regarding the benefits to be expected from surgery." It is only injudicious surgery and surgical interference when other methods would promise more, that furnish topics for adverse criticism. To state it differently, we need a higher standard of excellence, a broader knowledge of etiology and pathology and a more conscientious, painstaking profession, whose whole aim in its work should be centered around the one all-important factor, namely, the best treatment for each individual patient regardless of financial and all other considerations. A few years ago it was thought wise to urge members of the profession residing in every town and at almost every cross-roads, to familiarize themselves with the operative procedures of pelvic surgery, but the more we become acquainted with the awful complications so very frequently met with, complications which baffle the most skilful operators, the more convincing it is

that these obscure conditions should be referred to those whose large experience and careful training have fitted them for the great responsibility of thus dealing with precious human lives. It has now become a law of duty to refer our patients to those who have proved themselves competent to offer in their treatment the greatest assurance of success and the least risk to life. What conscientious physician would do otherwise? It always pays from every point of view, and, therefore, it has grown to be a custom which all recognize, to send patients to those who have shown by their attainments that they are especially fitted for the field they have chosen to follow. All that is needed, if the foregoing be true, is that greater excellence shall be attained, a broader knowledge of all that goes to make better diagnosticians, pathologists and therapeutists, electric, medical and surgical—elements to success that mean almost a lifetime in experience and a fortune in money to possess.

Considerable investigation is now being made by gynecologists with the view of testing the merits of leaving portions of the ovarian structure *in situ*, in order to prevent the establishment of the menopause, and in some instances with the hope of future pregnancy of the patient. Sufficient time has not been given this experimentation to afford us any definite conclusions. Doubtless some good may accrue from these methods in carefully selected cases. It should be the unvaried rule of all operators to preserve to the patient all her natural functions, unless perchance these functions are menacing to her health and endangering her life.

The advisability of removing the uterus, in every case of extensive suppurative disease of the adnexa, has grown in favor during the past year. The procedure has many earnest supporters and numerous opposers. In order to accomplish this end it is usually considered the safest to make the operation by the vaginal route. This question opens up an extensive field for discussion, and it has been found a most serious subject to dispose of satisfactorily.

The various methods for the removal of uteri for fibroids have had their share of attention by the profession, and no universally approved plan has been found. Each method has its merits in the hands of those who are attached to their special way, and all methods have their good points in properly selected cases. It would seem to be the ideal method where a hysterectomy is necessary and the patient has a fair amount of vitality, to remove the entire uterus. It has appeared to the writer that in a large per cent. of cases this operation may be done as safely as any other. That this method has not yet been perfected seems quite apparent, in view of the discussion relative to variations in the technique. Much adverse criticism has been indulged in on account of the fact that so much time is required in completing the toilet after the uterus is extirpated. This is perhaps an uncalled-for objection. My method is to grasp the anterior and posterior walls of the vagina as they are separated from the uterus with forceps, and as soon as the uterus is removed, pass with a curved needle a catgut suture through the lower portion of the stump of the right broad ligament and the anterior vaginal wall, the lower portion of left broad ligament and the posterior vaginal wall, then tie this puckering string as tightly or loosely as seems wise, keeping in view the propriety of passing a wick of gauze from above into the vagina for drainage. To execute this does not require more time than to write its description. Nothing more remains but to close the abdominal parietes and the operation is completed.

The use of pedicle clamps in vaginal hysterectomy has been the cause of much suffering and no little danger to life, and the aim should be to avoid their use if possible. It is more surgical and satisfactory to ligate with small strong silk the broad ligaments in sections and, after the uterus is extirpated, use slight traction on the attached ligatures, bring down below the peritoneum the stumps of the pedicle, and with a small curved needle carrying a catgut suture, the anterior and posterior walls of the upper portion of the vagina and the peritoneum are sutured in mass to the stump above the ligatures. Only one suture on each side is needed and they are introduced in the briefest time and your patient is ready for the introduction of a small wick of gauze drainage and tight or loose packing of the vagina with gauze. The ligatures, if properly used, will come away within twelve days and, in the meantime, they are out of the peritoneal cavity. No odor need be expected from the stump and the convalescence is established in twenty-four hours. This is my method and no case has been found where it could not satisfactorily be employed It is always prudent to have the most approved clamps at hand, but not often necessary to use them.

Each year new evidence is added to justify the removal of the entire uterus for cancer of the cervical portion. All other methods of treatment have been found to be less promising and hysterectomy (thanks to the skill of modern gynecologists) is now one of the safest of major gynecologic operations. Amputation of the cervix by the galvano-cautery knife and the thorough use of a sharp curette is a method of dealing with cervical cancer which has some enthusiastic supporters and will doubtless prove of great value, especially in the management of conditions too grave for total extirpation.

The relative merits of Alexander's operation and hysteropexy for uterine displacements have been subjects for unusual discussion during the past year. Some of the histories of cases and arguments presented have been very instructive and if the individual operator can not decide upon the best method it will not be for want of an abundance of literature on this subject.

No absolute evidence has been furnished the profession relative to a permanent cure by ligating the uterine arteries for fibromata, further than the reports of a few cases, which have been temporarily relieved. It is possible that further time and experimentation will bring results commensurate with the enthusiasm of the originator of this procedure, a distinguished ex-chairman of this Section.

The administration of glandular extracts after the removal of uterine appendages and in conditions demanding nutritive tonics, is attracting much attention and are considered by many who have used them to possess much value.

Thorough ablution of the peritoneal cavity with normal salt solution for the treatment of tubercular peritonitis has been found so efficacious that this procedure should not be rejected in the gravest conditions.

Time will not permit of further reference to the many important gynecologic and obstetric questions, which will continue for years to furnish matter for scientific discussion.

Before concluding, it gives me great pleasure to make honorable mention of this wonderful city, the

home of many great and good men, who have done, and are continuing to do, so much for the advancement of the science of obstetrics and gynecology. Without deprecating other cities, and other honorable, earnest and conscientious men, Philadelphia may be given the palm for being the home and field of research, of as great and honorable men as have ever wielded a pen, handled a scalpel, or disseminated from the rostrum the sterling truths and doctrines of our science. The names of some of those who have made medical and surgical records were mentioned in connection with the brief review of some of the work which was done earlier in the history of our ASSOCIATION. Nothing could afford me more pleasure than to record at length the work and special merits of all of Philadelphia's obstetricians and gynecologists. My personal acquaintance with some of them makes it nearly impossible to refrain from mentioning those who were my teachers and friends, when only a few years ago I was seeking knowledge in this special field, and received from them such earnest and thorough instructions that, whatever of success may have come to me from that time till the present hour, to the kindness of these great masters is due the entire credit.

Finally, I desire to attempt feebly to express my endless gratitude for the great honor of having been elected Chairman of this Section on this occasion. My sensibilities would, indeed, be obtuse, if I was not inexpressibly thankful for the honor. All that I can say will be merely words. My appreciation is heartfelt and genuine. No greater honor can be conferred on a member of the profession than to be chosen to preside over a body of men so cultured and distinguished in the profession as are you who compose the members of this Section of the AMERICAN MEDICAL ASSOCIATION.

ORIGINAL ARTICLES.

THE DIFFERENTIAL DIAGNOSIS OF SURGICAL LESIONS IN THE RIGHT HALF OF THE ABDOMEN AND PELVIS, WITH ESPECIAL REFERENCE TO THE DIAGNOSIS OF APPENDICITIS.

Presented to the Section on Surgery and Anatomy, at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, Pa., June 1-4, 1897.

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Inflammatory and other lesions in the right half of the abdominal and pelvic cavities have of late years assumed an increased importance. This is owing to the prominence given to the disease appendicitis, as well as to those inflammatory conditions of the adnexa in women to which the broad term pelvic inflammation is applied.

There can be no question in the minds of those who have given the subject much attention that the inflammatory conditions of the vermiform appendix constitute the most important surgical lesions of the abdominal cavity. This is true both for the male and female sex. While it is true that in the female it is less frequent in its occurrence than in the male, and in addition, the female is subject to inflammatory suppurative conditions peculiar to the sex, yet in estimating the importance of an affection we must take into account its life-destroying characteristics, the difficulties encountered in its diagnosis, the necessity for prompt action in its early treatment and for highly skilled surgical help in its later stages in addition to the frequency of its occurrence. So far as the danger to life in an unrecognized case is concerned, this is as great in the female as in the male. In the matter of difficulties of diagnosis, these are greatly increased in the female, owing to the possibility of errors arising from the presence of organs in the neighborhood that take on suppurative inflammation, which, in not a few instances, closely simulate that of the appendix; or possibly the occurrence of diseased conditions of these as a complication. The necessity for careful watching and prompt action in appendical lesions, as compared with those of the adnexa, is another feature which emphasizes the importance of the affection in the female. The mistake of postponing interference is more remote in the male than the female, owing to the absence of that element of doubt which must frequently exist in the latter. Upon the basis of these considerations it may be claimed with reason that inflammatory conditions of the appendix in the female lose none of their importance because of the lesser frequency with which women are attacked with the disease as compared to men, since it is in these very cases that errors in diagnosis with resulting failure to operate are most likely to occur. On the other hand, the preponderance of males loses its relative importance when the comparative ease of diagnosing the affection in this as compared with the female sex is taken into account.

All conditions which may be mistaken for appendicitis in the male, with the sole and rare exception of an inflamed right undescended testicle, occur likewise in the female. Some of these occur with even greater frequency in women, these constituting additional sources of error in the case of the latter sex. Of these latter may be particularly mentioned cholelithiasis and gall bladder affections, such as impaction of gallstones and resulting dropsy and empyema of the gall bladder, hyperacute inflammation and occasionally gangrene of that viscus, and angulation or torsion of the ureter occurring in connection with a movable right kidney. Gallstones occur nearly five, and floating kidney six or seven, times more frequently in women than in men. With special reference to the diagnosis of right-sided lesions it should be borne in mind that the right kidney is affected four times as frequently as the left.

When all these circumstances are taken into consideration it will be found that appendical lesions rank first in importance among the surgical affections of the abdominal and pelvic cavities.

With these facts before us the logical course to pursue in the present presentation of the subject will be the consideration of the diagnosis of appendicitis, and the differentiation of this disease from other inflammatory conditions, as well as such neoplasms as may simulate it.

Appendicitis, although in the great majority of cases pursuing an acute course from the commencement to the end of the attack, may be subacute or chronic in the beginning, afterward developing an acute condition; rarely it may remain subacute or chronic throughout its entire course; occasionally a chronic condition may follow an acute attack with the supervention of subacute, acute or even hyperacute exacerbations. Clinically, therefore, the cases may be

divided into the acute, the subacute, and the chronic. It is true that the acute cases may be still further subdivided into the hyperacute and the subacute, and the chronic division into cases which are chronic from the commencement (and remain without acute or subacute exacerbations, a rare occurrence in my experience), and those which follow an acute attack and are subject to more or less frequent relapses of the original acute condition. But for the practical purposes of the surgical diagnostician these subdivisions may be disregarded.

For the sake of laying a proper foundation for our study of the subject I will briefly call attention to the principal points to be borne in mind in the objective and subjective symptoms of these clinical forms of the disease.

Acute appendicitis.—The acute form of appendical inflammation is characterized by: *a*, sudden onset; *b*, colicky or cramping abdominal pains; *c*, vomiting; *d*, localized pain and tenderness; *e*, rigidity of the right rectus muscle; *f*, the presence of a tumor; *g*, fever. The pain is referred at the commencement, in the vast majority of cases, to the region immediately above the umbilicus, but finally becoming diffused in the entire abdominal region. If the patients are asked to point out the place where the pain was first felt they will most frequently indicate the center of the epigastrium. This fact has been a very frequent source of error, particularly when considered in conjunction with the symptom next to be considered. The occurrence of nausea and vomiting is of such frequency as to lead me to pursue the inquiry as to this symptom if it is not mentioned by the patient, and to look upon a case in which it is absent as being irregular or atypical in its development. The pain may be finally localized in the right iliac region, but the usual hypodermic injection which the patient receives at the hands of the attending physician is sufficient to allay all pain at first, both epigastric and iliac, and therefore this symptom does not count for much by the time the surgeon sees the case. Localized tenderness in the right iliac region however, is not so easily abolished although markedly diminished and perhaps more difficult of differentiation from the existence of a certain amount of sensitiveness which many observers have noted as being present in this region in conditions of health, or in connection with abdominal or pelvic lesions other than those of appendical origin, and in hysteric women. Rigidity of the right rectus muscle at its lower part is the result of an instinctive effort to prevent this portion of the muscular abdominal wall from taking part in the respiratory movements. It may likewise be prevented from manifesting its full significance by the attempts made to allay the pain by the administration of opium. The rigidity of neurotic subjects with hypersensitive abdominal surfaces should not be confounded with that arising from underlying inflammation. A tumor in the ileocecal region makes its appearance after the first or second day, and is situated directly opposite to and close upon the anterior superior spinous process of the ilium, or below this point opposite the upper concave portion of Poupart's ligament. When fully formed its presenting area corresponds to that of the superficial tenderness present. Fever is not marked in the commencement; some acceleration of pulse and elevation of temperature however is generally observed.

The variations from the usual and typical characteristics of the acute attack consist of: 1. The occurrence of primary, general abdominal pain rather than localized pain in the epigastrium, or a localization of the pain in the right iliac region in the beginning of attack. 2. Absence of vomiting due to the fact that the stomach is quite free from ingesta, although even under these circumstances nausea will be complained of, and the administration of some domestic cathartic, usually a dose of caster oil, will be almost certain to bring on vomiting. 3. Localized pain will usually be abated, and right iliac tenderness diminished by the administration of opiates. Cases of rapid gangrene of the organ may be unattended by pain in the region of the appendix in the beginning. 4. Opiates may so modify the respiratory movements as to render unavailable for purposes of diagnosis rigidity of the right rectus muscle, as well as to destroy that reflex tension of this muscle so frequently observed when pressure is made upon the wall of the abdomen in the ileocecal region. 5. The presence of a tumor is not usually available for diagnostic purposes until after twenty-four hours at the earliest; it is usually delayed until after forty-eight hours. In an exceptionally long appendix inflamed at its digital extremity, the tumor may be located elsewhere than in the ileocecal region. If the organ points downward and inward the tumor may be in the pelvis; if directly inward, behind the linea alba or beneath the left rectus muscle below the umbilicus; if upward and inward, behind the right rectus muscle and on a level with or even above the umbilicus; if directly upward and under the colon it may be found just beneath or at the usual site of the gall bladder; if upward and outside of the colon it may be found at varying points from the level at the crest of the ilium to the last rib. In deviations from the normal anatomic disposition of the ileocecal junction still further variations of position of the tumor may occur. In this manner cases of left-sided appendicitis, deep pelvic abscesses of appendical origin, and appendical abscesses in the right hypochondrium are to be accounted for. In the same manner and for the same reasons varying points of maximum tenderness occur. 6. *The pulse rate may be but slightly affected in the commencement, and ulceration and perforation of the organ may occur at any time during an exceptionally mild attack, with practically no rise of temperature.*

2. *Subacute appendicitis.*—In this form, as the term implies, the onset is less acute. The attacks may be so mild as to pass for a simple indigestion, or intestinal colic. A number of cases of indubitable appendicitis with hyperacute attacks have come under my observation, in which a history of preceding attacks that had been treated for "colic" or "indigestion" was obtained. Indeed, I have never known subacute appendicitis to be mistaken for anything else. The error is not a grave one, provided opium be not given and the possible onward course to the development of an acute or a hyperacute attack masked. The inflammatory action may now and then reach a sufficiently high grade to call attention to the ileocecal region. Tenderness at the site of the appendix may usually be elicited. There is usually no tumor to be found. In the cases of appendicitis that have come under my care, in which a history of preceding subacute attacks has been obtained, there has usually been found at the operation either one or more hardened fecal masses in the appendix, or an accumulation of secretion; the latter sometimes to the extent of an empyema, the secretion having undergone suppurative changes. In the

latter instances there have been found either partial or complete obliteration of the appendiculo-cecal orifice. This condition may be acquired as the result of previous disturbances, or be congenital in its origin. In any event, if permitted to continue, these cases of subacute appendicitis will almost of a certainty eventuate in an acute attack.

3. *Chronic appendicitis.*—Cases coming under this head may, as a rare circumstance, be chronic from the beginning. In the vast majority of cases they either eventuate from repeated subacute attacks, or follow a well defined acute attack. The characteristic clinical picture is marked by tenderness in the ileocecal region, with or without the presence of a tumor. The latter is usually the case if an acute attack has preceded the symptoms, particularly if this has been recent. The tumor is the result of an inflammatory environment of the organ; exceptionally an empyema of the organ may be sufficiently pronounced to constitute a tumor.

Practically, the differential diagnosis will lie between lesions of gall bladder origin; those originating in the intestine and not of necessity involving the appendix; and tubo-ovarian disease.

Of the gall bladder lesions, those involving the simple passage of a gallstone along the ductus communis choledochus may simulate the occurrence of acute appendicitis. Here the pain may be referred to the epigastrium, as in appendicitis; it radiates, however, toward the shoulder and the angle of the scapula. In the vast majority of cases it starts from the gall bladder as a fixed point. Whatever tenderness exists is referred to the lower border of the ribs and the region of the gall bladder. A gallstone impacted in the cystic duct and followed by dropsy of the gall bladder may give rise to some of the symptoms of chronic appendicitis; the downward projection of the gradually distended gall bladder may give rise to a tender tumor below the level of the umbilicus and beneath the right rectus muscle; infection of the gall bladder contents by bacterial migration through its walls, enervated by extreme pressure from within, may give rise to empyema of the gall bladder and cholecystitis, which in its turn is followed by febrile movement, abdominal pains and increased sensitiveness, all of which in their subjective symptomatology, may simulate appendicitis. On the other hand, even without the downward displacement of the gall bladder, the presence of an unusually long and vertically placed appendix, when inflamed, may complicate the differentiation between this and a gall bladder lesion.

Of the intestinal lesions in the ileocecal region, those involving an acute obstruction or a perforation of the bowel are the most important, as well as, in some instances, difficult of diagnosis, and these require a sharp differentiation and prompt operative treatment. Here the absence of a tumor can not be of practical utility in the diagnosis, since its appearance may be postponed for two or three days, and in the meanwhile the patient will certainly lose the chance of recovery offered by operation. Of less importance are the chronic obstructive conditions and neoplasms, for the reason that these of themselves do not, as a rule, urgently demand operative treatment when first discovered, nor do the appendical conditions for which they may be mistaken require that promptness in diagnosis and celerity of action necessary for the proper care of cases of acute appendicitis. The presence of a comparatively insensitive movable tumor characteristic of a neoplasm of the bowel, or of a doughy mass suggestive of impacted fecal matter, on the one hand, and an immovable and tender tumor on the other, to say nothing of the information to be gained by a close scrutiny of the history, offer a sound working basis for reasoning out the true condition present.

A close study of the question impels me to the belief that the surgical clinician will probably be called upon oftener to differentiate between appendicitis and tubo-ovarian lesions, than between the former disease and all others for which it is likely to be mistaken, combined. As a result of a somewhat extensive experience in appendical lesions, as well as in those conditions of the uterine adnexa that have been most frequently mistaken for the former, I would emphasize the following as the most important points to be borne in mind in the differential diagnosis:

Frequency.—Based upon the study of a large number of cases, the proportion is as 1 to 4 (males 80 per cent., females 20 per cent.).

History of the attack.—In a large proportion of cases the history in appendicitis is that of an acute onset. In tubo-ovarian disease a previous history of infection, with endometritis, salpingitis, ovaritis and pelvic peritonitis, and coincident progressive menstrual disturbances, may generally be obtained. Further, in considering the possibility of ectopic gestation in a given case, the fact that the diagnosis may be obscured, in an unmarried woman, by false statements made by the patient regarding the menstrual history, should not be lost sight of.

Pain.—In appendicitis the pain is usually acute and radiating, while in adnexal disease it is more apt to be dull and localized. Three considerations having a bearing in this connection should be borne in mind, however. The first relates to the fact that in subacute and chronic appendicitis the pain may be dull and localized; the second, that in acute appendicitis the pain may have been masked by the injudicious administration of opium; and the third, that the supervention of an acute exacerbation of a chronic pelvic inflammation may give rise to pain sufficiently acute and severe to simulate appendicitis.

Vomiting.—This is exceedingly common in appendicitis, and of much less frequency, relatively, in adnexal disease.

Tenderness.—In the great majority of cases the tenderness, in appendicitis, is located at the site of the appendix, and in tubo-ovarian disease it may be traced to the adnexa. The maximum point of tenderness in appendicitis corresponds to or above the level of the anterior superior spinous process of the ilium, while in adnexal disease it is located well below this level. Considerable force is required to elicit the point of tenderness by the vaginal touch in appendicitis; this is easily accomplished by this route in adnexal disease. *Per contra*, the tenderness brought out by external pressure in the last named, is nothing like as great as that by the vaginal touch, while considerably less pressure in the appendical region will show the latter to be extremely sensitive in appendicitis. Movements of the uterus by the examining finger do not, as a rule, give rise to complaints of pain from the patient, in appendicitis, while they are almost certain to do so in adnexal disease. The nearer proximity of the tenderness to the median line and bony anterior pelvic wall, examined either externally or by the vagina, the greater the

chance of pelvic inflammation being present, and *vice versa*. The remarks concerning the possibility of masking pain by opium apply with equal force to the symptom of tenderness.

Chill or rigors.—A chill is of infrequent occurrence in appendicitis, and is a not uncommon symptom in acute exacerbations of adnexal disease.

Fever.—Fever is present in appendicitis, although its grade is of no service in estimating the severity of the attack, particularly in cases in which the temperature is but slightly elevated, and the pulse not markedly accelerated. It may be absent, or nearly so, in chronic adnexal lesions, until a spread of previously existing infection, or the introduction of fresh infectious agents is announced by its presence.

Muscular tension.—While rigidity of the right rectus muscle is occasionally absent in appendicitis, it is almost invariably so in adnexal lesions, unless the latter is complicated with considerable peritonitis. So marked is this difference, as between the two conditions, that this sign is almost pathognomonic in the differential diagnosis. It is rarely marked in tubo-ovarian disease, although like the symptoms of pain and tenderness, it may be masked by opium in appendicitis.

Tumor.—Tumor may be present after the second or third day in appendicitis; rarely before the latter. In tubo-ovarian disease it is usually present when the surgeon is called in. In appendicitis its usual location is beneath the right rectus muscle and opposite the anterior superior spinous process of the ilium, or to the outer side of this area, where it is easily made out by abdominal palpation. In tubo-ovarian disease it is more easily found by vaginal touch, while abdominal palpation may fail to reach it altogether because of its low position behind the pubic arch. It is rare that a tumor of appendical origin can even be felt by the vaginal touch, much less satisfactorily palpated by conjoined manipulation.

Course.—Appendicitis usually follows an acute course, while in adnexal lesions a subacute or chronic course is the rule. In chronic appendicitis there is almost always a history of at least one acute attack and relapses are common as long as there is any impairment of the nutrition of the organ, even with but slight infection present. In adnexal disease, while the chronicity of the course may be disturbed by the supervention of acute exacerbations, it is rare to obtain in the history a statement of a well defined and sudden onset. The practitioner should be well on his guard to distinguish between the last named and chronic relapsing appendicitis. The subjective symptoms alone will not suffice for this, and physical examination only can reveal the true condition of affairs. Rupture of a pyosalpinx offers a grave condition and presents great difficulties in differentiation between this and perforative peritonitis of appendical origin. Fortunate it is that to open the abdomen promptly in either case offers the patient the best chance for recovery.

Of the rarer conditions known to simulate appendicitis may be mentioned a case in which a lithopedion escaped from a right Fallopian tube (Martin of Berlin), a fibromyoma of the ileocecal region (Sonnenburg), a small suppurating dermoid (Bergmann), a ruptured right rectus muscle occurring while the patient was under the influence of liquor, and a ruptured gall bladder under the same circumstances (my own cases). I have been compelled to reopen the abdomen a second time in two cases in which adhesions formed between the stump of a removed right ovary and tube and the appendix gave rise to symptoms of appendical origin. Since these experiences I have made it a rule to remove the appendix when intraperitoneally located, in all cases of abdominal section. Further, one should not fail to take into account the possibility of the coexistence of chronic and acute lesions of the adnexa and appendix, or the simultaneous presence of an acute lesion of the one and a chronic lesion of the other. The presence of the appendiculo-ovarian ligament of Clado furnishes a route of bacterial migration from the intestine to the right ovary. The presence of the bacterium commune coli has been demonstrated by Kiefer in an ovarian abscess, and Dr. Robert L. Dickenson, one of my colleagues at the Brooklyn Hospital, recently operated on a case in which the appendix was directly attached to the right ovary, inflammatory conditions of both coexisting. The focal lesion in this case probably existed in the appendix.

Finally, one should not fail to take into account the difficulties which may present themselves in establishing the diagnosis of appendicitis in the male sex under circumstances of an exceptionally long appendix passing deeply into the lesser pelvis. Sonnenburg reports two such cases where the primary abscess was situated in the Douglas *cul de sac*, in which access was gained to the suppurating mass through an opening made between the rectum and bladder. The following list embraces some of the most important of the conditions which have been mistaken for appendicitis within my own knowledge or have been reported upon good authority:

Acute conditions.—Subphrenic peritonitis, gall bladder lesions, acute intestinal obstructions, paratyphlitis, rupture of right rectus muscle, ruptured pyosalpinx, ruptured ectopic gestation, acute torsion of right ovarian cystoma, acute torsion of right hydrosalpinx, right-sided hemato-salpinx, acute peritonitis, paroxysms of pain due to right movable kidney.

Chronic conditions.—Abscess in the abdominal wall, impacted ureteral calculus, fecal impaction, tubo-ovarian inflammation, carcinoma in the ileocecal region, retroperitoneal sarcoma presenting in the right iliac fossa, neoplasms of the right ovary, right-sided chronic salpingitis with recurring acute exacerbations, fibromyoma in the cecal region, adhesions following operations on right adnexa.

In order to facilitate the study of the differential diagnosis of the surgical lesions of the right half of the abdomen and pelvis, I have prepared the following:

ACUTE APPENDICITIS.

Anamnesis, etc.—Most frequent in males (80 per cent.) Rare at the two extremes of life. Previous good health immediately preceding present attack as a rule. History of previous attacks in a certain proportion of cases. Sudden onset.

Pain.—Cramping or colicky and rather constant. Most acute in epigastrium and region about the umbilicus; more or less diffused later on, and may finally center in right iliac region.

Nausea and vomiting.—Present in great majority of cases. Usually ceases when contents of stomach are vomited, unless extensive peritoneal inflammation occurs early. Rarely persistent and intractable.

Tenderness.—Markedly localized in the center of the right iliac region at the commencement, but becoming more diffused with the extension of the peritoneal inflammation. Is frequently marked along the middle of Poupart's ligament. In the rare cases of non-descent of the cecum the tenderness may extend to the parts immediately below the umbilicus or be located to the left of the median line. Present, although in lesser degree in the direction of the ascending colon particu-

larly when the appendix lies to the outer side of the colon and points directly upward. When the appendix is extraperitoneally situated the tenderness may be pronounced in the lumbar region.

Muscular tension.—Right rectus muscle tense at its lower part. Rigidity pronounced in proportion to peritoneal involvement.

Tumor.—Rarely present before the lapse of forty-eight hours following the attack and may be delayed until the third or fourth day. Its location is quite constant in the right iliac region but may vary with abnormalities in the location of the cecum. Is immovable and usually rounded and smooth.

Impairment of function of intestinal canal.—Distension of coils of intestine in the neighborhood. Bowels may be moved by enemata and cathartics before diffuse septic peritonitis sets in.

Fever.—Slight elevation of temperature and acceleration of pulse in the commencement but not a trustworthy guide in their relation to the threatened severity of the attack, particularly when these symptoms are not marked.

SUBPHRENIC PERITONITIS.

Anamnesis, etc.—History and mode of onset will vary with source of peritonitis. Arises most frequently from perforating ulcer of stomach or duodenum; next in frequency from the appendix. Abscess of the kidney, cholecystitis, lesions of the pancreas, and perforation of intestine elsewhere, furnish examples.

Pain.—Pain severe and more constant and less colicky and lancinating in character than in appendicitis. Located in upper part of abdomen.

Nausea and vomiting.—Not marked unless peritonitis becomes general. When due to ulcer of the stomach the vomiting precedes the attack.

Tenderness.—Localized in epigastrium or hypochondrium.

Muscular tension.—Limited to region above umbilicus.

Tumor.—Not discernible until abscess forms. Then demonstrated by percussion. Littre's diaphragmatic sign (drawing in of the intercostal spaces one after another, as contraction of the diaphragm takes place) is of importance.

Impairment of function of intestinal canal.—Not marked.

Fever.—Fever varies with infection. With formation of abscess becomes more marked.

GALL BLADDER LESIONS.

Anamnesis, etc.—Cholelithiasis, the most common underlying cause, occurs five times as frequently in females as in males and in women over thirty as a rule. Dropsy and empyema usually preceded by indefinite feelings of distress referred to region of gall bladder; less frequently by recurrent attacks of hepatic colic, not necessarily accompanied by jaundice. Perforation by gallstone, supervention of suppuration in dropsy, and the occurrence of acute inflammation of gall bladder marked by sudden onset.

Pain.—Less acute and colicky in dropsy and resulting empyema than in acute inflammation of gall bladder and perforation from gallstones. In the latter equally so with appendicitis. More distinctly localized in the commencement in all these than in appendicitis. Generally referred to right hypochondrium.

Nausea and vomiting.—Absent as a rule.

Tenderness.—Present. Marked in acute inflammation and perforation. Less in empyema. Occupies a somewhat larger area in the right hypochondrium than that which is characteristic of appendicitis in the right iliac region, but may extend below the line of the umbilicus when the gall bladder is greatly distended.

Muscular tension.—Upper portion of right rectus, and sometimes both recti, more or less rigid.

Tumor.—Generally present when patient comes under surgeon's care. Is rounded, smooth, immovable, and usually found at normal site of gall bladder. Exceptionally and under circumstances of considerable distension, may reach below umbilicus.

Impairment of function of intestinal canal.—None as a rule. There may be some distended coils in the neighborhood.

Fever.—Fever present and pulse correspondingly accelerated.

ACUTE INTESTINAL OBSTRUCTION.

Anamnesis, etc.—*Invagination:* Two-thirds of the cases occur in males, one-third in females. Three-fourths of all cases of invagination are in the neighborhood of the cecum. It is especially an accident of the young (34 per cent. under 1 year and 56 per cent. under 10.) *Volvulus:* Eighty-seven per cent. occur in large intestine; of these one-half occur in the neighborhood of the sigmoid flexure, and less than one-third in the ileocecal region. Occurs in males in the proportion of two to one. Most frequently absent between the ages of 30 and 40. *Obstruction of abnormal contents or foreign bodies:* Almost 50 per cent. due to gallstones; 43.5 per cent. due to fecal impaction; remainder due to enteroliths and substances swallowed. Obstruction by gallstones three times as common in females as in males and usually in patients past 50. The ileocecal region the most frequent seat. Usually preceded by hepatic colic, jaundice or symptoms pointing to the entrance of the gallstone into the intestine by ulceration through the gall bladder and bowel wall. *Internal strangulation:* The most frequent cause of intestinal obstruction (35 per cent. of all cases); 90 per cent. in the small intestine; 83 per cent. in lower abdomen; 67 per cent. occur in the right iliac fossa; 70 per cent. occur in males; 40 per cent. occur between the ages of 15 and 20; of these, inflammatory adhesions cause the strangulation twice as often as vitelline remains (Meckel's diverticulum and persistent remains of vitelline blood vessels). Relatively uncommon in childhood, when it does occur is usually caused by vitelline remains. *Strangulated diaphragmatic hernia* occurred in 10 per cent. of 1,134 cases of internal strangulation (Lichtenstein). Usually regarded as a very rare condition. Internal strangulation when due to *adhesions* may be preceded by history of some inflammatory abdominal or pelvic lesion, recent or remote. *Invagination* and *volvulus* give us preceding history. *Obstruction by gallstone* is usually preceded by jaundice, hepatic colic or symptoms pointing to entrance of the gallstone into the bowel by ulceration through the gall bladder and bowel wall. In strangulated diaphragmatic hernia there is almost always a history of severe injury, although the original condition may be congenital.

Pain.—Severe and intermittent at first; finally rather constant, with acute exacerbations. Location has no diagnostic value in differentiating between the different forms; most frequent in the neighborhood of the umbilicus. Does not become localized.

Nausea and vomiting.—Frequent and persistent. When contents of stomach are vomited the vomitus is first bilious, then yellow and finally fecal.

Tenderness.—Limited tenderness less easily differentiated.

Muscular tension.—General rather than limited to lower portion of the right rectus.

Tumor.—Rarely present except in invagination, when it may be fixed after inflammatory action occurs. Occasionally found in obstruction by foreign bodies, when it is mobile.

Impairment of function of intestinal canal.—Constipation complete; passage of flatus absent. Tenesmus in 15 per cent. of cases of volvulus and in 55 per cent. of invagination. Bloody discharges. Tympany present, increasing with the duration of the obstruction.

Fever.—Pulse more or less accelerated, increasing in frequency with duration of obstruction. Absence of fever in the beginning rather characteristic.

PARATYPHLITIS.

Anamnesis, etc.—Exceptional and of rare occurrence, as compared with appendicitis. Follows inflammatory condition of cecal wall (typhlitis) and of its serous covering (perityphlitis), having its origin in fecal accumulations. History of loss of appetite, disturbance of digestion and constipation. More or less sudden in its occurrence, but less abrupt than in appendicitis. The first acute symptoms may be due to ulcerative perforation of the bowel wall.

Pain.—Dull and constant, and less diffused as compared with that of appendicitis, usually limited to right iliac region from commencement.

Tenderness.—Present and limited to area involved. Less acute than in appendicitis.

Muscular tension.—Marked in proportion to acuteness of the symptoms.

Tumor.—Present early in cases of stercoral origin, in which case the tumor will present as a sausage-shaped mass in the cecal region, which may be indented with the finger. When suppuration has taken place tumor will present same characteristics as in suppurative appendicitis.

Impairment of function of intestinal canal.—Constipation, overcome by cathartics, which in the early stages of the affection sometimes relieve all the symptoms.

Fever.—Slight fever in commencement. With advancing suppuration, becomes more pronounced.

RUPTURED PYOSALPINX.

Anamnesis, etc.—Comparatively infrequent. Pelvic inflammation. Gonorrheal or other infection, pelvic distress and pain varying in intensity, and menstrual disturbances. Onset sudden.

Pain.—Severe, diffused, constant and of long duration.

Nausea and vomiting.—Rarely present or marked until diffuse septic peritonitis sets in.

Tenderness.—Extreme and general below umbilicus. Location of tenderness made most easily manifest by vaginal touch.

Muscular tension.—Absent until diffuse septic peritonitis occurs, which supervenes rapidly in case of rapid emptying of abscess cavity.

Tumor.—Sensitiveness usually so great that induration can only be felt by vagina, and then not always satisfactorily as a distinctly defined tumor.

Impairment of function of intestinal canal.—Not present until intestinal paresis and finally complete paralysis of peristalsis from diffuse septic peritonitis occurs.

Fever.—Steady and marked increase in pulse rate and rise of temperature.

RUPTURED ECTOPIC GESTATION—PELVIC HEMATOMA.

Anamnesis, etc.—More frequent in its occurrence than formerly supposed (35 times out of 3500 autopsies; Formad). Less frequent in young primiparas than in older multiparas. Symptoms referable to normal pregnancy (absence of menses, nausea, swelling of breasts, softening of cervix, etc). A bloody vaginal discharge may take place subsequently to last menstruation. Labor-like pains, bloody vaginal discharge and if the pregnancy is advanced the casting off of a decidua may precede the rupture of the fetal sac. Onset sudden with symptoms of collapse and internal hemorrhage.

Pain.—Acute and diffuse over lower portion of the abdomen. Is of short duration.

Nausea and vomiting.—Absent.

Tenderness.—Not localized, if present.

Muscular tension.—Absent until peritonitis sets in, then general.

Tumor.—If patient survives primary rupture sufficiently long, the physical signs of pelvic hematocele or pelvic hematoma may be found. These distinguishable by conjoined manipulation and are more easily determined from the vagina than from the abdominal surface. In many cases identification of tumor not at once possible even under an anesthetic.

Impairment of function of intestinal canal.—None.

Fever.—With profuse hemorrhage, pulse rapid and feeble, temperature subnormal, later rising slightly. General symptoms of acute anemia present, such as pallor, thirst, air-hunger, etc.

ACUTE TORSION OF RIGHT OVARIAN CYSTOMA.

Anamnesis, etc.—Occurs in about 10 per cent. of cases of ovarian cystoma. Occurs most frequently in small tumors. If tumor is large a history of such may be obtained. In two out of four cases observed by the writer the symptoms came on while the patients were leaning over a wash tub engaged in rubbing clothes upon a washboard. Sudden onset.

Pain.—Violent pain in the right side of abdomen.

Nausea and vomiting.—Generally present.

Tenderness.—Considerable area of tenderness below and to the right of the umbilicus.

Muscular tension.—Present and somewhat general. Localized rigidity not marked.

Tumor.—Present. Increases rapidly in size.

Impairment of function of intestinal canal.—Absent.

Fever.—Fever absent in the commencement.

TORSION OF RIGHT-SIDED HYDROSALPINX.

Anamnesis, etc.—Rare. The writer has seen but one case and finds no other in the literature. Disturbances of menstruation (frequent, painful, and prolonged flow). Pelvic distress incident to pelvic inflammation in general. Sudden onset.

Pain.—Acute pain referred to entire right side of pelvic region.

Nausea and vomiting.—Absent.

Tenderness.—Localized and marked just above bony brim of pelvis.

Muscular tension.—Absent.

Tumor.—Located just behind insertion of right rectus muscle and extending to the right about half way to Poupart's ligament.

Imparment of function of intestinal canal.—None.

Fever.—Pulse accelerated. No fever.

RIGHT-SIDED HEMATOSALPINX.

Anamnesis, etc.—Infrequent in occurrence. Previous history of menstrual disturbance, the flow usually appearing too frequently and lasting beyond the usual time. Dysmenorrhea. Onset of symptoms rather sudden and usually due to escape of blood from distal end of tube and resulting localized peritonitis.

Pain.—Not marked save when peritonitis occurs. May be at first localized, afterward referred to the pelvic region generally.

Nausea and vomiting.—Absent.

Tenderness.—Not well marked by palpation from the abdominal surface. If present is below the level of the middle of Poupart's ligament. Usually easily elicited by the finger in the vagina.

Muscular tension.—Absent as a rule.

Tumor.—If felt from without is well below the level of the middle of Poupart's ligament. Is much more readily distinguished from the vaginal than from the abdominal surface.

Impairment of function of intestinal canal.—None.

Fever.—Varies with the acuteness of the inflammatory conditions. Fever *not* a marked feature.

ACUTE PERITONITIS.

Anamnesis, etc.—Frequency depends upon affections underlying the attack. Idiopathic or primary peritonitis probably never occurs. *Perforative peritonitis* usually results from acute appendicitis, typhoid ulceration, foreign bodies, penetrating wounds, intestinal obstruction, strangulated hernia, blows upon the abdominal surface, and excessive handling of the intestines in the course of operations involving opening of the abdominal cavity. *Infective peritonitis* is caused by extension of infection from inflammatory lesions of the uterus and Fallopian tubes in the female, suppurative hepatitis, gall bladder affections, suppurative kidney lesions, and operative infection. *Symptomatic peritonitis* occurs in the course of an acute or chronic disease such as pleurisy or pneumonia. *Tubercular peritonitis* usually pursues a chronic course. *Syphilitic, rheumatic* and *gonorrheal* peritoneal infection very rare.

Pain.—Varies with the virulence of the infection and the rapidity of the extravasation. At first localized, afterward becoming general; may not be sufficiently prominent to occasion complaint.

Nausea and vomiting.—Early, persistent and intractable nausea and vomiting almost invariably present. Contents of stomach first vomited, then bile, and finally in fatal cases, material from small intestine. Hemorrhage from mucous membrane causes a dark brown vomitus.

Tenderness.—At first localized at point of original infection, then becoming generalized.

Muscular tension.—Progressively increases from original focus of peritoneal infection until in diffuse septic peritonitis the entire muscular abdominal wall becomes excessively rigid.

Tumor.—None present in diffused peritonitis. When more or less circumscribed a sero-purulent collection may occur in the course of time and give rise to a tumor.

Impairment of function of intestinal canal.—Early occurrence of paralysis of peristalsis, and resulting intractable constipation. Distension due to the forcing of gas from the still functionally unimpaired portion of intestinal canal into the paralyzed coils. In some instances the entire tract is almost simultaneously paralyzed, in which case distension may be less marked or absent.

Fever.—The pulse is rapid, out of all proportion to the rise of temperature. Fever is present as a rule.

PAROXYSMS OF PAIN DUE TO RIGHT SIDED MOVABLE KIDNEY.

Anamnesis, etc.—Proportion of women affected greatly in excess of males. Most frequent between the thirtieth and fortieth years. Right kidney twelve to thirteen times more often affected than left. Child-bearing appears to have a decided influence in its production. Previous history of symptoms of movable kidney, viz., dragging, weight and dull pain in loin and side of abdomen, aggravated by exercise and relieved by rest. In women, suffering is increased by menstruation and pregnancy. Occasional sense of something moving. History of previous attacks of paroxysmal pain resembling renal colic. Sudden onset if torsion is present, accompanied by suppression or marked diminution of the quantity of urine.

Pain.—Paroxysmal. Referred to the renal region and extending in the course of crural or sciatic nerves.

Nausea and vomiting.—Frequently present during paroxysm.

Tenderness.—Not a marked symptom. Palpation gives rise to a peculiar sickening sensation.

Tumor.—Present and movable. Characteristic outline save where hydronephrosis has supervened as a result of frequent angulation of the ureter. May usually be traced to or replaced in renal region.

Impairment of function of intestinal canal.—None during attack. Disturbances of the large intestine, either diarrhea or constipation may form a part of the history.

Fever.—Negative.

CHRONIC APPENDICITIS.

Anamnesis, etc.—History of at least one preceding acute

attack as a rule, with relapses. Rarely the clinical picture presents as a chronic condition from the commencement. This, however, may obtain in tubercular infection of the appendix.

Pain.—Referred to right iliac region betwen relapses.

Nausea and vomiting.—Not marked. Generally absent.

Tenderness.—Marked. Located at site of appendix.

Muscular tension.—Not marked.

Tumor.—Present. Immovable and usually located opposite middle of Poupart's ligament and attached to extreme right lateral lining of abdomen.

Impairment of function of intestinal canal.—Not marked.

Fever.—Fever not marked.

ABSCESS IN THE ABDOMINAL WALL.

Anamnesis, etc.—Is quite frequently of appendical origin, and therefore may give a corresponding history.

Pain.—Present. Strictly localized at the inflamed point.

Tenderness.—Localized. Greatest at most prominent part of tumor.

Nausea and vomiting.—Absent.

Muscular tension.—Not marked. Secondary induration may be mistaken for it.

Tumor.—Present. Fluctuating when sufficiently advanced. May be demonstrated in abdominal wall by lying patient prone and having him voluntarily lift occiput or feet from table.

Impairment of function of intestinal canal.—Absent.

Fever.—Present. Subject to remissions as in suppurative processes elsewhere.

IMPACTED URETERAL CALCULUS.

Anamnesis, etc.—Previous attacks referrable to nephrolithiasis, viz., lumbar distress aggravated by exercise; pus, blood and albumin in the urine; vesical irritability; pain in testicle, etc. Attacks of renal colic preceding the impaction and diminution of amount of urine excreted accompanying it.

Pain.—Dull, boring, intensified and becoming paroxysmal by spasmodic contractions of ureters. Radiates toward the groin and testicles, and sometimes to rectum.

Nausea and vomiting.—Not a frequent nor prominent symptom.

Tenderness.—Present, but not so definitely marked or fixed as in appendicitis.

Muscular tension.—Usually absent. When present, spasmodic.

Tumor.—Absent.

Impairment of function of intestinal canal.—None.

Fever.—Absent as a rule. At no time a marked symptom.

FECAL IMPACTION.

Anamnesis.—Follows most frequently a constipated habit and is observed oftenest in females and the aged. Favored by sedentary habits. May give a history of previous attacks. Hysteric and hypochondriacal, as well as spinal cord affections may form part of the history. Gradual onset.

Pain.—Not marked. Dull and obscure when present.

Vomiting.—Not a characteristic feature.

Tenderness.—Slight as compared with that of appendicitis.

Muscular tension.—Absent.

Tumor.—Presents itself as a doughy swelling.

Impairment of function of intestinal canal.—Constipation. Sometimes obstruction; but this rarely intractable.

Fever.—Absent.

TUBO-OVARIAN INFLAMMATION.

Anamnesis, etc.—History of menstrual disturbances usually of the too frequent type. Flow apt to become dark and clotted, thin leucorrheal, vaginal and muco-purulent discharge from endometritis. Symptoms gradual in their early development, but occasional acute exacerbations may simulate chronic relapsing appendicitis.

Pain.—Not severe, as a rule, save in acute relapses. With peritoneal involvement it may be sharp, but is constant, and not paroxysmal. Referred to iliac region, extending at times down the thigh and frequently accompanied by backache. Increased by over distension of bladder, distension of the intestines with gas; pressure and walking, riding or jarring aggravate it.

Nausea and vomiting.—Absent as a rule. Where present, accompanies supervention of an acute exacerbation.

Tenderness.—Not so marked as in acute appendicitis. More easily elicited by vaginal examination than external manipulation.

Muscular tension.—Absent.

Tumor.—The formation is an inflammatory mass. Conjoined manipulation maps it out distinctly and locates it in vaginal fornix. Uterus is pushed forward by mass. An exceptionally long appendix may give rise to a similar tumor.

Impairment of function of intestinal canal.—Constipation as a rule. This may be occasionally due to adhesions between adnexa and intestines. It is most apt to take place upon left side, the sigmoid flexure approximating more closely the left broad ligament. The appendiculo-ovarian ligament takes but little part in inflammatory attachments. Flatulence.

Fever.—Present in the relapses, and absent or nearly so in in the intervals.

CARCINOMA IN THE ILEOCECAL REGION.

Anamnesis, etc.—Symptoms come on slowly and increased by occurrence of constipation. Cancerous growths of bowel most frequently found in large intestine. Ten out of thirty-seven cases involved the cecum (Frank).

Pain.—Dull, with occasional exacerbations of lancinating pain.

Vomiting.—Absent.

Tenderness.—Usually spread over a larger area than in appendicitis.

Muscular tension.—Absent.

Tumor.—Hard, irregular, not of large size, and movable through a limited area. Not usually limited to cecum, but involves either ileum or colon.

Impairment of function of intestinal canal.—Obstruction to passage of intestinal contents when disease is advanced. One case of primary carcinoma of the appendix observed by the writer (see *Brooklyn Medical Journal*, April, 1897, p. 252).

Fever.—Absent.

RETRO-PERITONEAL SARCOMA PRESENTING IN THE RIGHT ILIAC FOSSA.

Anamnesis, etc.—Progressive loss of health and strength in youth or early adult life. Less frequently observed in those at or past middle life.

Pain.—Dull, aching, constant.

Vomiting.—Absent.

Tenderness.—Present; not distinctly defined or limited to point of invasion.

Muscular tension.—In advanced cases the corresponding thigh may be retracted from involvement of psoas muscle suggesting morbus coxarius.

Tumor.—Fixed, smooth and broadly definable.

Impairment of function of intestinal canal.—Absent.

Fever.—Absent.

DISCUSSION.

Dr. J. McFADDEN GASTON of Atlanta.—Some years ago I undertook to lay before this ASSOCIATION a paper upon the surgical lesions of the iliocecal region and it was upon such points which at that time were likely to attract attention. Dr. Fowler has brought forth a subject of great interest at this day. When we come to the bedside we have much difficulty in analyzing these points, especially in the case of families where one suspects appendicitis complicated with peritonitis. There are several points in connection with the troubles in this region that Dr. Fowler did not allude to. I had quite a puzzling case myself in this very line. The general symptoms simulated typhoid, but the local indications pointed to a local development of inflammation, and we thought of appendicitis. By temporizing, the case turned out to be one of typhoid. You have all seen cases of extreme sensitiveness in the iliocecal region in typhoid fever. There is sometimes also an inflammation of Brunner's glands which leads to the development of a tumor; and some of you have probably also met with cases in which you have had enteroptosis occurring in the ileocecal valve. I remember such a case in which death resulted in forty-eight hours. Even after death the grip of the valve was so tight that it would have torn it rather than give it up. In a simple case of contraction of the valve the intestine was readily liberated. There are other troubles that one can have at this point and it is important that we should study the matter up.

Dr. HOWARD A. KELLY of Baltimore.—I have been accustomed to pay close attention to this matter for some years and there are a number of diagnostic points which are very important and satisfactory. One can localize appendical inflammations in a woman and differentiate them from pelvic inflammations by paying attention to several points. In spite of the difficulties which may be maintained and demonstrated in most cases, there are cases of inflammation of the appendix and the right adnexa, probably 10 or 15 per cent. In one case reported in the Johns Hopkins Hospital Reports, a streptococcus inflammation was found in both the tubes and the appendix. I can hardly agree as to the propriety of removing the appendix, but I would rather get the meso appendix and lift it up over the pelvis. I know of three cases, like those the author has described, in which the appendix has become attached to a stump, and I operated on one case a year ago. One was also operated on by Dr. Hunter Robb and one by Dr.

Maguire. They found adherent appendices being pulled upon.

Dr. F. W. McRAE of Atlanta, Ga.—In two of the cases I have had; the only symptom present for the first forty-eight hours was pain in the bladder, and in both cases there was retention of urine. The cases did not occur in my practice and the trouble with the appendices was not discovered for several days.

Dr. GARDNER of Rome—In reference to the class of cases of which Dr. McRae speaks I can report one. The patient was attacked suddenly with pain over the entire abdominal cavity. I saw him a few hours after the first attack and my diagnosis was a probable recurrent appendicitis, as he had had appendicitis one year before. The pain grew rapidly worse but was not altogether on the right side. The patient died in thirty-six hours and postmortem examination revealed the fact that an adhesion existed underneath the bladder.

Dr. FOWLER—In reply to Dr. Gaston, who stated that I did not mention typhoid, I would state that I came as near to it as I dared to, consistent with the title of my paper. There is a suppurative condition which occurs around the appendix giving rise to abscess, but all abscesses in the iliocecal region are not of appendical origin. I have knowledge of one case in which a perityphlitis formed about the site of an appendix, that had been removed. It was a case of secondary infection and the gut showed marked thickening. There was a history of impacted feces. The co-existence of ovarian and appendical disease is very important. Whenever I open the abdomen for appendical disease, and the inflammation is confined to the appendix, I carry my finger down into the pelvis and ascertain the condition of the adnexal organs. I have found in a good number of cases that a cirrhotic condition of the right ovary is frequently present as compared to the left. This is the case in that peculiar anatomic condition known as Clado's ligament, which is a peritoneal fold from the meso-appendix to the ovary itself. There is a constant irritation arising from this connection which will give rise to changes in the appendix. These inflammatory conditions, which evidently give rise to the cirrhotic condition of the ovary, may have their origin in the bacterium commune coli. As to receiving the appendix when you open the abdomen for other purposes, this is a question. If I thought its removal would add to the dangers of the patient I should prefer to let the patient take the chances of having appendicitis rather than remove it. In a typical excision of the appendix I use the thermo cautery so as to thoroughly sterilize the point of section, and with this precaution I believe it is safe to remove the appendix in any operation that you may do. The method which I employ takes no longer than does any other. Dr. Kelly's suggestion to elevate the appendix may be a good one, but he evidently overlooks the fact that this may imperil the integrity of an organ which already possesses but a low degree of vital resistance and in which inflammatory conditions may easily follow circulatory disturbances. The latter may be induced by the altered position of the meso-appendix which he brings about.

THE ETIOLOGY AND CLASSIFICATION OF TUMORS.

Presented to the Section on Surgery and Anatomy at the Forty-eighth Annual Meeting of the American Medical Association, at Philadelphia, Pa., June 1-4, 1897.

BY SAMUEL H. FRIEND, M.D.

MILWAUKEE, WIS.

A comparative histologic study of normal cells, those of all tumors and the two malignant growths, cancer and sarcoma, indicates some striking similarities and differences. These cells arising as they do from previously existing normal cells, this is not especially remarkable, though it is worthy of note. Enumerated these differences are: 1, a limiting membrane; 2, fibrillar; 3, protoplasmic; and 4, nuclear structure in all. In benign growths this varies in predominance according to structural origin; but in the two malignant growths there is: *a*, an increased thick limiting membrane in cancer and a normal one in sarcoma; *b*, an increased protoplasmic structure and nuclei in both, especially striking in cancer where the nuclei predominate. The study of the biology of these malignant tumors indicates this: 1, that they are rapidly growing cells; and 2, that this rapid growth is intimately associated with the predominance of nuclei in the cell. An examination of all of the different cells of the tissues of the normal organism gives but two sets of cells which bear a striking resemblance to these cells as to nuclei and protoplasmic structure present. These are the ovum and spermatozoa and the leucocytes of the blood. This similarity is suggestive. Tracing the origin of the leucocytes of the blood, from the work which the investigations of Ehrlich stimulated, and the zeal of Schwartze, Golasch, Fink, Gabriczewski, Müller, Reider, Neusser, Weiss Piorry, Boeckmann, Halla, Tumas, von Jaksch, von Limbeck,[1] Pée, Goldscheider, Jakob and many others roused, all indicate that these leucocytes are, 1, locally increased whenever any cause determines blood to a part; and 2, generally increased in all digestive processes, in diseases of the blood-making organs and in most acute febrile and in many chronic conditions, irrespective of the organ or organs diseased. Cohnheim[2] first advanced these theories, Neusser[3] further advanced them and Weiss[4] directly suggested them. The leucocytes are produced by any and all tissues of the organism. The inductions of Cohnheim, Neusser and Weiss, taken with the following, indicate the truth of such an interpretation and its application to pathologic phenomena.

As first observed by John Hunter and as others have confirmed, there is an increased number of leucocytes at the seat of a cut. I will simply draw the attention to this phenomenon as occurring not only in all traumatisms but, as above stated, in all normal functional action and conditions where there is a sudden or a prolonged determination of organic, inorganic, mechanical, electric and chemic action and matter to a part. As to the place of the leucocytes in physiologic activity and in the healing processes, details are unnecessary. Though their origin in traumatisms has been determined, yet a recapitulation may prove suggestive. If a cell or cells of the skin or muscle be cut or bruised, or if it be stimulated beyond a definite range, the immediate effect is to determine excessive blood containing excessive leucocytes to the parts and to stimulate the entire cell. So it not only attempts but does rapidly reproduce itself. While in a normal condition of the organism the phenomenon of cell division is produced within a definite range of time, by karyokinesis in an abnormal state, as in traumatisms, etc., the phenomenon is hastened and, as a result, borne out by investigation, the normal cell stimulated and, as if to compensate for the new environment of the tissues, reproduces itself not only by normal but also abnormal karyokinesis, and likewise by simple division and gemmation. A cut, a bite of the skin, etc., irrespective of the structural or functional agent, affects the true skin, all of the cells[5] which make it up as an organ and the entire organism. Locally the structure of the blood vessels, blood, lymphatics, hair and sweat follicles, muscles, etc., have their reproducing powers augmented as enumerated, and the result is an innumerable number of new cells having the characteristics of leucocytes. An investigation of the blood demonstrates that these cells and those brought to the parts are thrown in and about the wound, and that some leucocytes, more than normal, independently find their way into the blood by their very motion. The fact that infection progresses and becomes general or special either through the agency of the leucocytes containing the organism or by their

being independently carried into the blood vessels or lymphatics, proves the same truth. That under the same and different conditions these processes also occur within the organism, seems a natural inference.

Studying micro-organic diseases, especially when some lesion exists, one of the first observations made either in an examination of the blood and of the tissues involved, is an increased number of cells and leucocytes in the parts. As has been observed, first by Virchow in his observations of the tissues surrounding a new growth, as described in tubercular processes, and more recently noted by Metschnikoff in the struggle of the phagocytes, the leucocytes are the natural protectors of surrounding normal tissue. Again, in the blood of those having cancer or sarcoma, as investigated by Velpeau, Breard, Bouillaud, Broca, Jollin, Cruveilhier, Paget, Lücke, Andral, Gavaret, Hayem, Palma, Rieder and many others, a leucocytosis is the rule. To detail all the conditions where this phenomenon is observed is unnecessary, for the entire phenomenon can be included in the following: All organic structure and function, chemicals whether organic or inorganic, mechanical, thermal, electric contact, in the organism and organic chemicals by excessive activity, numbers and quantity, in the mechanical, thermal and electric processes by direct excessive contact, can produce an excessive cell reproduction. The process of this is that excessive quantities of blood and leucocytes are determined to the parts and furnish excessive nutrition to the overstimulated cells. A study of all normal tissues indicates that each and all have a definite, constant number and arrangement of cells. Diseased tissue indicates the contrary, that is, an indefinite number and partial disarrangement of the structure and function of the cells. Taking the histology of cancer or sarcoma as an illustration, these growths are types of both, the normal arrangement persisting being the general structure of cell which adheres to that of hereditary mother cells. Going back to the above generalization in regard to the stimulus of cell reproduction, and as Roux[6] intimated, in localized abnormal cell reproduction, as in all natural phenomena, there is a struggle made by all cells of organs and tissues to retain their original form, size, arrangement, function, numbers, etc. Applying this to the above and to all blood studies, the indication is that all overproductions, 1, either find their way into the blood or, 2, if retained in a part, become starved and starve the fixed cells or, 3, are consumed and furnish extra nutrition or, 4, become infected and die or, 5, there is a localized overgrowth, and in these ways the cells of tissues of organs and systems attempt to protect themselves, the organ and the entire organism from an overgrowth. When a certain number is reached in the blood, the normal process appears to be that the liver and other organs destroy the overproduction. As understood, each cell of each organ and tissue has a normal overproduction of cells and supplies a certain number to the blood, and of the entire organism, a constant number persists in the blood. An organ or structural part of an organ becoming diseased does one of many things: It either increases or diminishes both function of the organ and tissue, and that of the entire organism. To illustrate: In typhoid fever the digestive processes are inhibited; in tuberculosis of the lungs the respiration action is inhibited; in meningitis the nerve function is increased, etc. Varying with these inhibitions and excitations there can be observed concomitant inhibition and excitation of other functions. In some conditions one or more functions are excited, others inhibited. As can be observed in some cases of tuberculosis, while the rule is for a leucocytosis to exist, yet in some cases a leukopenie occurs. This evidence demonstrates the interdependency of the entire organism. In localized functional and structural disease this evidence would seem to indicate that where the normal range in numbers of leucocytes does not occur in the blood and is not compensated for, the production or the overplus reproduction of the cell of the entire organism is inhibited, and that the overproduction of cells in the diseased tissue is retained within that area. As is indicated by giant cells and the ring of granulation tissue limiting tuberculous processes, this evidence would suggest, as first observed by Virchow, that this ring of cells was present to protect the tissue of the entire organism from infection. As understood at the present time, this is not only true but, as first suggested by Metschnikoff, the cells of this tissue attempt to destroy the organisms present. We have learned that not only cells and minute organisms and their chemic products excite cell reproduction, but likewise many chemicals, as the alkaloids, acids, salts, thermal agents as heat and cold, electricity and mechanical pressures, as observed by Hirt, H. Meyer, Pohl, Binz, Löwit, Goldscheider, Jakob, Winternitz and many others. These facts are demonstrated by direct clinical and experimental observation. It will hardly seem necessary to go into the minute details of the increased production or different kinds of cells[7] in all normal and abnormal phenomena. The only limitation is the cells of the different tissues. Yet, upon observing the abnormal production externally, irrespective of its cause, and knowing that the same process and phenomenon must occur internally, one asks, when they have neither external nor internal outlet nor compensate for some pathogenic process, what becomes of the cells? Studying the blood of those having external wounds, structural diseases of different organs, internal and external new growths, we find that while there is an increased number of loose cells about the parts, there is also an increase of leucocytes in the blood. All of this evidence with that of those mentioned demonstrates, from the similarity of the cells produced to the leucocytes of the blood, that, as Weiss concludes, their relationship is not a coincidence, but they are the same cells. This conclusion brings to the etiology of new growths an entirely new interpretation and to our knowledge much light.

Reasoning now as we can upon biologic,[8] embryologic,[9] comparative anatomic,[10] pathologic,[11] physiologic[12] and clinical evidence,[13] that knowledge combines to indicate that we can typify the structure and function of the organism of man as a single cell. This is indicated by the integumentary system corresponding to the limiting structure and function; the osseous system corresponding to the fibrillar structure and function; the muscular, nervous, blood vessel, digestive, excretory and secretory system corresponding to the protoplasmic structure and function; the ovaries and testicle corresponding to the nuclear structure and function. As the entire organism can be so typified, so can each system, organ and cell or combination of cells making an organ and system. All detailed studies demonstrate this and also that the integumentary structures and function of man is an evolution of the limiting membrane of lower organisms. It has passed

through and represents the different stages, namely: 1. Chitinous cells, fibrous, calcareous, scales, horn, feathers, hair, with the evolution and specialization of the present limiting membrane structure with its epidermal specialization; 2, a fibrillar network beginning with fibrous, elastic, fibro-elastic, calcareous and being gradually specialized to represent all structure with the evolution and specialization of an osseous system as represented in man; 3, a protoplasmic structure ranging from the complex structure within the limiting membrane and fibrillar structure, as indicated in the lowest organisms, to the evolution of the specialization of digestive, vascular, secretive, excretive, muscular, sensory and motor nervous structure of man;[4] a nucleus being a part of the whole structure, as indicated by the function of gemmation and division in lower organisms. Then arises an evolution of the nucleus. Though it be retained in every cell of the organism it ranges gradually to the evolution of the complex structure and function as indicated in the ovaries, uterus, vagina, testicles and penis of man.

Functionally it can be observed that each part of this structure has a definite range of action. Studying this comparatively it can be observed that this limiting membrane protects the three internal structures from these external natural and artificial environments: Atmospheric, liquid and solid pressure, heat and cold of gases, liquids and solids, electricity, chemical affinity, cohesion, adhesion, the attacks of other animals. This analyzed indicates, as is absolutely known, that variations of all of these forces exist and have a definite action on the organism. Applying this interpretation to man it can be observed that the limiting membrane directly and the other structures indirectly have, besides these natural forces, an environment subject to known action within definite limits, known and applied by man, evolved by him, organized by limitation. By this new environment man is made capable of accommodation irrespective of the natural environment. This makes an artificial environment, which though distinct is so intimately associated with the natural environment that it is of difficult discrimination in its activity. Yet it has likewise a definite direct action upon the action of the entire structure.

Studying again, comparatively, the functional action of the external environment on the protoplasmic, fibrillar and nuclear structure, it can be observed that this functional action has also a direct connection or communication as indicated by the gases, liquids and solids absorbed. These in turn, while producing direct action of the three named structures, also produce an indirect action on the entire structure. Analyzing the matters absorbed by lower organisms, making a direct and indirect internal environment we find them to be gases, liquids and solids, both inorganic and organic, producing direct functions and persistence of all the structures. Applying this again to man we find the same with the difference that gases, liquids and solids absorbed are artificially prepared, and that as a result of the aggregation of man and the consequent organization of communities and cities these matters are contaminated. The result is still further contamination owing to this artificial preparation and contamination. This result is due: 1, to matters excreted, and 2, by increase of the range of forces necessary to convert these matters to the complex simplicity of matters for the requirements of persistence of all divisions of structure.

Studying comparatively the action of lower organisms and man, we find that in the former this is confined to motion, absorption, secretion, excretion and reproduction, that is, the action of primary instincts. Following each function we find that this is gradually augmented until the complex instinctive and conscious activity of man is reached. Here can be observed the specialization and effects of the control of instincts, conscious control of nature's forces, the limitation of the activities of lower animals and for the specialization and vocation of man for necessities of persistence in time and space, the use of inorganic and organic matter. As all investigations indicate, man's original environment was tropical and subtropical. He collected in varying numbers over large spaces of land and his functional activities were confined to absorption, secretion, excretion, reproduction and excessive motion in quest of foodstuffs and preservation of life against enemies. Studying man as affected by a changing environment and comparing this with his present activities the following as mentioned is demonstrated: That he has augmented and modified through the instinctive recognition of the laws of the survival of the fittest, compensation and accommodation, both the natural environment and himself; and as a result in the building of cities, etc., he has made an artificial environment. Through the application of the laws of the forces of nature's phenomena, by these forces he has also increased the activities of producing a survival and persistence of self by making vocations which through training specialize the special senses and entire organism and which have a value for sustenance and survival. This is dependent on supply and demand and an interchange.

The artificial environment evolved has been the shelter of clothing and house and the use of prepared foods, the former two compensating the variations in atmospheric temperature and pressure, etc., and all used in functional activity. The first, clothing, has developed from the use of skins, pelts, etc., to the gradual employment of the limiting membrane of animals, their larvæ and vegetable matter which are prepared by man—an exchange of his labor or action for other necessities—these materials to compensate for variations of temperature, etc., are made into clothing for body, foot and headwear. The second, house, has been evolved from caves, the use of skins, branches of trees, grasses, earth, to the gradual use of logs, stones, the manufacture of bricks, etc. Thence the evolution proceeds to the present heterogenous matter combining all and compensating not only for variations in temperature, but likewise for protection against storms of wind, water, hail, snow, etc.

The third, food, has been evolved from the use of unprepared animals, vegetables, to the evolution of the preparation and preservation of both and the concentration of some as sugar, salt, fats, etc. These concentrations compensate for the renewal of structural matters used in man's functional activities. Man is then a natural cell and an artificial organism. As a natural cell he has the activities of motion, absorption, secretion, excretion and reproduction. As an artificial organism he has acquired compensatory shelter of clothing, house and preparation of foodstuffs. These are produced by him through the specialization of all of his activities. The effect of the compensations is to produce activities of parts and the whole structure not normally, hereditarily developed. As can be observed the newly born infant is almost immediately tightly clothed, and as a rule in

this country fed with artificial foodstuffs. Even in earliest infancy either the one or the other or both produce skin or limiting membrane eruptions. Take again in later childhood, there can be observed the development of various structural changes as could be endlessly enumerated. These changes produced directly on those using and making artifices occur in the infant, child, youth and adult. The process is, that active and passive structural parts and normally retrograding structure are abnormally stimulated in a range out of harmony with normal structural and functional possibilities. As a result overgrowths are produced. As is borne out by pathologic investigation these overgrowths can be classified naturally under four original typical, structural and functional biologic divisions, namely: 1. Limiting membrane; 2. fibrillar; 3, protoplasmic and 4, nuclear with the various combinations as observed clinically, anatomically and histologically as follows:

1. Excessive growths or tumors of the limiting membrane typified by clavus, cornu cutaneum, etc.

2. Excessive growths or tumors of the fibrillar structure typified by fibroma, chondroma, osteoma, etc.

3. Excessive growths or tumors of the protoplasmic structure typified by myxoma, myoma, lipoma, neuroma.

4. Excessive growths or tumors of the nucleus typified by sarcoma and cancer.

As microscopic evidence indicates these pathologic overgrowths, give the following mixtures either alone or in combination, making the following subgroups:

a. Excessive limiting membrane with diminished fibrillar, intraprotoplasmic structure and nucleus, typified by dermoids.

b. Excessive fibrillar with diminished protoplasmic, limiting membrane and nucleus, typified by fibroma, osteoma, chondroma.

c. Excessive protoplasmic structure with diminished nucleus, fibrillar and limiting membrane structure typified by lipoma.

d. Excessive nucleus with diminished protoplasmic and fibrillar and limiting membrane structure, typified by sarcoma of special organs and tissues.

e. Diminished limiting membrane with excessive fibrillar, protoplasmic structure and nucleus, typified by cancer or sarcoma of special organs and tissues.

f. Diminished fibrillar with excessive limiting membrane, protoplasmic structure and nucleus typified by papilloma.

g. Diminished protoplasmic structure with excessive limiting membrane, fibrillar structure and nucleus typified by cancer or sarcoma of special organs or systems as the lip, tongue, etc.

h. Diminished nucleus with excessive limiting membrane, fibrillar and protoplasmic structure, typified by angioma.

i. Absent limiting membrane with excessive or diminished fibrillar, protoplasmic structure and nucleus typified by polypi.

j. Absent interfibrillar with excessive or diminished limiting membrane, protoplasmic structure and nucleus typified by adenoma.

k. Absent protoplasmic structure with excessive or diminished limiting membrane, fibrillar structure and nucleus as typified by cystic tumors. The processes and effects of all of these are determined by the laws of the survival of the fittest, compensation and accommodation. This functional action determines excessive cell division and blood to the parts containing excessive nutrition held in solution and in the leucocytes. Both of these give one of the four parts of the structures represented in every system, organ and cell an advantage in predominance.

Studying their clinical histories we find that while the origin of some tumors in certain places can not be defined, yet the same growths in other places give a definite etiology. Reasoning as we can that all organs, systems and cells have represented all four structural parts as a result, it is made possible to apply the logic of that history to the growths hidden to the naked eye. I speak of intra-abdominal, thoracic and cephalic growths. As is indicated by external tumors whether they be benign or malignant, all growths have a definite cause. As already stated it can be demonstrated that all cell division can be excited or increased in time by organisms. It matters not if the organisms are excited by cells of tissue pathogenic organisms; by chemicals of both organic and inorganic matter, which includes the products of micro-organisms; by mechanical, thermal and electric applications. This cell division is further demonstrated by physiologic and embryologic evidence which indicates the excitation of the reproduction of all structural divisions of organic cells. This can be seen in the impregnated ovum, which not only is itself stimulated, but likewise stimulates an excessive motion, absorption, secretion, excretion, reproduction, etc., of all structural divisions of itself and the organ or tissues in which it lodges. The uterus in normal pregnancy and the Fallopian tubes in extra-uterine pregnancy indicate the same things.

Physiologic and experimental evidence also indicates how cell reproduction of protoplasmic structure is stimulated in functional excess as in specializing systems and organs, as the muscular, digestive systems, etc., seen in athletes, gourmands, etc.

Biologic, pathologic, clinical and experimental evidence indicates such excitation of all structural division of the cells or minute cell organisms by pathogenic organisms. This appears in tubercular processes, etc., and as is indicated by clinical and experimental evidence, the same excitation occurs through contact with organic and inorganic matter by chemicals, mechanical pressure, heat, cold and electricity, organic cells in excess, bacilli and micrococci, acids, ptomains, alkalies, excessive pressure of clothing, etc., excessive heat and excessive cold, then heat, and lastly through galvanic electricity.

As pathologic evidence of the pure mechanical excitation of the reproduction of protoplasmic and nuclear structure, we know that epithelioma of the lip may be caused by pressure. In embryologic excitation we have dermoids, which indicate the persistent determination of excessive nutrition to a part by either rests and vestiges of congenital significance. A periodic wandering and retention of fixed cells likewise observed in metastasis indicates the same determination. We know that sarcoma or nuclear excitation of bone structure may be produced by excessive pressure, as by excessive lying upon a firm hard matter such as a hard board table. Here the great trochanter undergoes too much pressure and consequently excites excessive division and leucocytes to the parts and compels a too rapid and perverted cell division. In clavus, fibroma and myoma, etc., the same logic of either organic, inorganic, chemic, mechanical excess, etc., will hold good save that in these cases the rapidly dividing cell which matures repre-

sents equally one of the structural parts of the cells of its original tissue. This is probably caused by a normal mitosis, the quality of the stimulus and the nutrition coming to the parts. This pathologic evidence indicates that irrespective of the location of the overgrowths the same etiologic application of excessive cell reproduction, etc., obtains. An analysis of the cell of cancer and sarcoma indicates, as already mentioned, that both represent structurally and functionally a predominance of protoplasmic and nuclear structure, their discriminating difference being in the limiting membranes. The former is said to have its origin in epithelial, the latter in connective tissue cells. From the above interpretation of the entire organism this division is quite irrelevant, as boths cells practically represent a predominance of the same structural divisions of the cell, namely, protoplasmic and nuclear structures. As these structures exist in all cells of all tissues these two growths can be found in any tissue of the entire organism.

Studying the microscopic and macroscopic area of both cancer and sarcoma we find that they have a definite and constant physiognomy. Detailed this picture shows in cancer first an overgrowth of the distinctive cell and a compensatory growth as if to limit the extension of the growth of these cells, of the connective or fibrillar cells. In sarcoma the growth is of the same cells without any attempt at compensatory hyperplastic, morphologic limit of surrounding cells caused by a too rapid formation of the cells. Yet a close study shows the great similarity as detailed, but while both cells grow rapidly in sarcoma the cells develop so rapidly that the impressed phenomena of cohesion, adhesion, etc., have a diminished force. It is needless to remark after carefully detailing the organization of the two structures that their similarity is striking and their etiology is suggested to be the same. Studying these suggestions physiologically, clinically and histologically, and from the comparative points of view, they demonstrate that these overgrowths are caused by a predominant stimulus to the nucleus of the cell in a range not in harmony with functional requirements or with the development of the mature cell from which they originate. The presence of a perverted mitosis demonstrates microscopically its biology. This stimulus is either long continued or persistent, periodic, organic, chemic of both inorganic and organic matter; mechanical either long continued, persistent, periodic excess, as pressure, heat, cold or electric application with a concomitant excess of the absorption of cells rich in chromophilic matter. If now we recall the origin and cause of the rise and fall of the leucocytes in the blood we have demonstrations of their sources and kind; the effect of their retention and excessive numbers. As already stated, as suggested by Cohnheim, Neusser, Weiss, and as is indicated by all clinical evidence, by the effect observed microscopically in the immediate effect in the healing process of cuts and bruises, the leucocytes of the blood are an overproduction of cells of all the different tissues. Some of these tissues are richer in nuclear and other matter than others. The question then comes what becomes of these cells when they are predominantly retained within the tissues? As is indicated by pathologic evidence we have atrophies, hypertrophies, hyperplasias and tumors as final structural disease effects. All are caused by structural and functional excess. Reasoning from these premises the mechanism of structural and functional organic and inorganic, chemic, mechanical, thermal and electric action upon the cells of tissues is to produce an excessive determination of blood to the parts. This mechanism also produces an excessive motion, absorption, secretion, excretion and division of the cells of the part and of the cells of the entire organism, consequently of the leucocytes brought to the parts. As is indicated in traumatisms this demonstrates that more converted and to be converted nutrition comes to the part than is normal. If this overproduction is not compensated for by being taken into the general circulation, etc., there is then produced, as pathologic evidence demonstrates, either atrophy, hypertrophy, hyperplasia or tumor. As observation and experimentation indicates and pathology demonstrates, the application of the above to these four structural changes, is as follows: When a retention of these overproduced cells occurs, a time will occur when they will produce an excessive: 1. Reproduction; 2, absorption; 3, excretion; 4, secretion; 5, motion, which in turn will react upon each cell exciting a further cell division. The effect of this must then be to excite either all the cells of the different divisions of the tissues of the part or of a single tissue or division of tissues, when there will be an overgrowth of all or one or two, or three, or four structural divisions of the cell of the tissue.

Studying the histology of an atrophic cell we find that the nuclear and protoplasmic structure is predominated by fibrillar and limiting membrane structures with a change of form and size of cell, and chemically a change in the secretion and excretion. The interpretation of this implies that the overproduction of cells have become starved and in turn have starved the fixed cells and compelled a lower structural organization. The scar cells especially show this. The scars produce before antiseptic surgery was known emphasize this. The small hemorrhages in the brain and spinal cord producing the well-known sclerosis also show this. The process and effect of all this is determined by the predominant action of the law of accommodation.

If not atrophy but hypertrophy occurs, then the contrary can be observed. All structural parts of the cell become equally enlarged and with the all there is an abnormal function. This indicates that the structural and functional increase is simply compensatory and in harmony with requirements, the increased soluble nutrition and leucocytes furnishing the necessary matter. The process and effect of all this is determined by the predominant action of the laws of accommodation and compensation.

If again such an abnormal activity exists and neither atrophy nor hypertrophy occur, but a hyperplasia, then the interpretation is: That the matters absorbed have contained pathogenic organisms or that man has had external contact with them. These lodge: 1, in a fixed cell, and excite excessive activity, or 2, are carried to a distant division of the organism either in the blood current or, 3, are taken up and so transported by leucocytes already existing in the blood and ultimately lodged in a fixed cell. In this fixed cell, in the struggle which occurs, all activities are increased. This struggle not only calls for and receives extra nutrition, but stimulates all of the cells surrounding the parts, as is demonstrated by all pathogenic symptoms and microscopic investigation of typhoid fever, tuberculosis, etc., and all kinds of septic wounds. As is indicated in the healing processes, these abnormally stimulated cells are of two kinds, viz.: auxiliary or

vanishing, and fixed cells, the first being the wandering leucocytes, which as above detailed are normally compensating and protecting. They have predominating protoplasmic and nuclear structure and as compensatory function an excessive motion, absorption, secretion, excretion and reproduction. The structure and function can be demonstrated histologically and chemically by the tissues and the blood. The presence of fixed cells is indicated by the healing process. This demonstrates that some of the excited and rapidly dividing, absorbing, etc., cells persistently grow and develop compensatory structure and function of original mother cell, and in this way produce compensatory regeneration by producing a cell as detailed in atrophy. Applying the laws of biologic phenomena to this process and effect, the indication is that the laws of the survival of the fittest and accommodation have a predominant action.

If instead of atrophy, hypertrophy or hyperplasia, an overgrowth occurs, the indication is that the causes as mentioned produce and persistently determine an excess of the leucocytes and the fixed cells. This interpreted indicates the following simultaneous phenomena: Excessive motion, absorption, secretion, excretion, perverted mitosis of fixed cell of part, in the two malignant overgrowths. There is also excessive determination of blood to the parts together with its excess of converted nutrition held in solution and an excess in number of leucocytes coming from tissues (apply Weiss' conclusions), leucocytes structurally rich in nuclear and protoplasmic matter. Besides having their activities augmented these leucocytes are consumed by the fixed cells and furnish extra nutrition. This makes a definite reinforced mechanism dependent upon the persistence of the original cause amplified by biologic activities. Applying the laws of biologic phenomena to this process and effect, the indication is that the laws of the survival of the fittest, compensation and accommodation predominate.

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X-RAYS AND X-RAY DIAGNOSIS.

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A great discovery, great in the sense of discovering a fundamental principle or a fact profoundly modifying existing theories or hypotheses, is not infrequently found to be of most value, from the purely utilitarian standpoint, in some branch of science, or some art, other than that in which it was primarily made. One of the most striking examples of this statement is to be found in the history of what has become bacteriology. Pasteur was seeking for the cause of fermentation, and more particularly the fermentation of grape juice: yet his discovery has revolutionized the practice of surgery and almost transformed the practice of medicine.

Admitting that science and many of the useful arts have profited largely by the discovery of Pasteur and the researches of subsequent investigators the fact remains, and I think will not be disputed, that society has been most benefited through the influence of the discovery and its developments upon medicine and surgery. Many other discoveries exhibit the same fact though hardly so clearly and typically as the one cited.

Very recently we have been furnished an illustration in the discovery of a new form of radiation made by Professor Roentgen in December, 1895, and announced by him at Wurtzburg in January, 1896. The researches of Roentgen were no more due to a desire to advance the practice of medicine than were the researches of Pasteur; the one was investigating certain physical phenomena in the domain of pure science; the other was investigating the cause of certain processes in a commercial industry, the production of wine. But as with the discovery of the yeast fungus, so with the discovery of the X-ray the principal benefit has accrued to medicine. I therefore deem myself justified in considering "X-rays and X-ray diagnosis" as eminently a subject in medicine.

A detailed and connected account of the steps in the process which led up to the discovery by Professor Roentgen of this form of radiation, unknown and unsuspected, would mean a careful review of the work of Galvani, Faraday, Coulomb, Thompson, Geissler, Crookes, Hitthoff and Leonard, to say nothing of many other and less widely known investigators. Coulomb and others studied carefully the inductive capacity of dielectrics, and naturally gases at various pressures were included. From a study of inductive capacity, it was but a step to the observation of disruptive discharge, and Geissler made the first notable advance in regard to discharge through gas at lower than atmospheric pressure.

In Geissler's experiments polarity first assumed an important position as presenting certain different and interesting phenomena, depending upon the direction of current flow; Crookes and Hitthoff, by virtue of improved apparatus enabling them to obtain higher degrees of vacuum, were able to more accurately differentiate the phenomena exhibited at the kathode and anode poles during discharge in vacuo. Crookes particularly was impressed with the anomalous character of the phenomena exhibited at or by the kathode terminal during discharge in a vacuum, and was led to suggest a fourth state of matter, being otherwise unable to explain the conditions found. This announcement and his experiments, which were exhaustive, naturally evoked much interest and criticism among scientists. Philip Leonard commenced investigating the subject with the result that he was very soon able to obtain much more curious manifestations of kathode discharge—he demonstrated the possibility of detecting the presence of rays, which he assumed to be kathode rays, outside of the vacuum in which they were produced. These many discoveries attracted the attention of numerous scientists, among whom was Professor Roentgen, and it was while studying the phenomena recounted by Crookes, Hitthoff and Leonard, that he observed another form of radiant energy emanating from the vacuum tube, a form of radiation apparently different from any previously noted; for while light and kindred rays could be polarized, re-

flected and refracted, and kathode and Leonard rays could be deflected by a magnet, the rays observed by Roentgen were not subject to reflection, refraction or magnetic deflection. Hence as they were unknown he called them "X." This X radiation, merely another discovery in pure science, has become one of the most if not indeed the most valuable aid in the diagnosis of a large majority of surgical cases, and this within little more than a year. Its present value if only in presenting bone lesions and foreign bodies to the visual examination of the surgeon will hardly be denied by any competent observer, and its possibilities can not be prophesied.

So much interest has been evoked by the possibility of "seeing one's own bones," that a great deal of kindergarten investigation has been done, and too often conjecture and speculation have assumed the rightful places of scientific observation and cool-headed deduction; opinions have been asserted as facts by men who unquestionably should know better. With no discovery within my recollection has the immediate and general excitement been so intense, or the subsequent deluge of absurd and improbable statements so great as with this discovery of Professor Roentgen.

The requisite conditions for the production of X-rays are essentially, first, an apparatus capable of producing a difference of electrical potential sufficient to produce a spark in air of three or more inches, and second, a non-conducting vessel of some material penetrable by X-rays, and in which a vacuum of three mm. or less may be maintained—this ordinarily takes the form of a glass tube or bulb, with one or more platinum wires sealed into the glass terminating within the tube in a variety of shapes. It is not essential but it is desirable that the terminal to which it is intended to attach the leading-out wire (the kathode terminal) be made of aluminum, except the portions making the glass seal and external to the tube. The anode terminal may be of any conducting material, preferably platinum. When an excessively high potential current is used, one terminal only need be made in the tube, but the generally available apparatus necessitates the operation of the tube on a closed circuit of which it is itself a part, and hence the tube must be provided with two or more terminals. A large number of tubes of different materials, shapes, sizes and arrangements have been made and experimented with; and the question of the material, size and relative position of the terminals has been carefully studied, the consensus of opinion being that for the production of X-rays of high penetration and in considerable volume, the tube must be of German or lime glass, generally spherical, and the kathode terminal of aluminum in the shape of concavo-convex disk, the concave surface being directed inward and the curve and position such as to bring the kathode rays to a focus upon the platinum disk in which the anode terminates. The anode disk should be inclined at an angle of about 135 degrees from the kathode. This style of tube, now generally called the focus tube, I concluded from my early experiments would be most satisfactory, and subsequent trial demonstrated the value of my conclusions. I was not alone in the discovery, for a few days after I had my first focus tube made I received a description of a form of tube precisely similar which had been designed by a professor at Kings College, London. Several times I have made discoveries which in a short time I found had been independently made by other investigators.

The high tension current for exciting the tube may be obtained in a variety of ways which are divisible into three general types, *i. e.*, the induction or Rhumkoff coil, the high tension alternating current transformer or "Tesla coil" and the friction or influence machine.

In the induction or Rhumkoff coil, the high voltage is produced by breaking a direct current circuit in a primary of few turns of large-size wire wound about a soft-iron core, the high tension current being induced in a secondary winding consisting of many turns of fine wire insulated from the primary coils. There is a certain amount of current induced in the secondary upon making or closing the primary circuit, but as it is the result of electric induction only, it is very small in comparison with the current made by breaking the primary circuit, the high voltage in the latter case being the result of the electric induction plus the magnetic induction of the soft-iron core. When a high resistance is introduced into the secondary circuit, the current in that circuit produced on closing the primary circuit becomes negligible and the effective voltage may be regarded as unidirectional. Coils of this type have been constructed to give a spark in air forty-two inches long. I have made a number of such coils of various sizes, using different wire for the secondary winding.

The high frequency high potential alternating current transformer, sometimes called "Tesla coil," offers a very inviting field for the experimenter. The apparatus consists essentially of some source of E.M.F., which may be made to charge condensers, the latter being disruptively discharged into the primary circuit of the coil immersed in oil and consisting of a primary and secondary coil, each being of comparatively few turns of wire, the secondary, however, having more turns than the primary; the resultant high potential current is produced by electric induction and is an alternating current.

The influence machine is sufficiently well known to need no description and may be constructed to produce very high differences of potential and a current either direct or alternating. To produce the best effects from either the Tesla apparatus or the static machine a very careful adjustment and balancing of the apparatus is essential; therefore, when the apparatus is intended solely for the production of X-rays, the direct current coil is preferable to either of the other devices as being more easily, uniformly and satisfactorily operated. I have experimented with all three of these forms, but for actual diagnostic work employ only the induction coil.

In physics, not a great deal more is known now than was contained in Professor Roentgen's orginal paper. I early found the X-rays to emanate from two or more points in the tube, the anode terminal and the area bombarded by the cathode stream. I also made several experiments to ascertain the law of absorption of these rays and found that the metals increase in absorptive power with increasing atomic weight; the salts of the same metals may be arranged with reference to their absorptive power in an increasing series as follows: carbonate<nitrate<sulphate<chlorid<bromid<iodid.

Several theories are current as to the nature of these rays; some investigators deem them longitudinal ether vibrations, others regard them as streams of projected particles; the majority of physicists, however, are of opinion that in this phenomenon we have

only another electro-magnetic wave, an ultra violet wave of very short wave length, probably about three octaves above the shortest previously known ultra-violet waves. Certainly the X-rays are non-homogeneous, for several quite different series of phenomena may be observed, produced by them. I myself demonstrated either four distinct forms of X-rays, or else rays of four different wave lengths, almost a year ago. The dermatitis Roentgenii, which will be subsequently mentioned, seems to have some relation to this question of non-homogeneity of the radiations from the vacuum tube, indifferently called "X."

The application of X-rays in medicine has thus far been confined almost entirely to surgical diagnosis; a few instances are recorded where they have been therapeutically employed, or rather empirically employed, in the treatment of tuberculosis pulmonalis, with, in some cases, apparently good results. Whether the benefit in these cases was, however, to be assigned to the action of the rays *per se*, or to the counter-irritation produced by extensive dermatitis R., remains an open question.

The list of foreign bodies that have been accurately located by means of the X-rays is a very large one and includes the greatest diversity of objects and covers almost the entire body. I have personally located and by that means enabled the operator to easily remove needles and pieces of glass from the hands and feet, and bullets from various parts of the body, including the second lumbar vertebra, and a hypodermic needle in the thorax. As most of the foreign bodies with which we have to deal are metallic, and as the coefficient of absorption is greater for the metals than for any of the salts of the metals or any organic substances, the foreign body usually intercepts many more of the rays than the surrounding medium and consequently casts a more dense shadow.

Fractures and dislocations, though usually easy of diagnosis, are sometimes very puzzling, especially when near joints and when some time has elapsed after the injury and the soft parts are much swollen. No matter what the natural ability, education or experience of the fingers they may often be at fault; here, however, we have an agent that can not err; if it give an answer at all, it must be truthful and must show to the examiner the actual conditions. The fractures and dislocations that have been examined with much profit by this means includes almost every large bone, almost every joint in the body, and no man who has availed himself of this aid in such cases will speak of it in any terms save those of highest praise.

Certain diseases of bone are also diagnosable by means of these rays, owing to the difference in absorption existing between the diseased bone and normal healthy bone. Exostoses intercept a number of rays equal to the number absorbed by the same quantity of similar normal bone, and hence are diagnosed by comparison with a skiagraph of the same region showing the normal anatomic outline and relations. In necrosis and tuberculosis, however, the conditions are different and diagnosis permitted, owing to the coefficient of absorption of the rays being not constant for both healthy and diseased bone.

Some hard tumors situated in the soft parts may be located and examined to a certain extent; any attempt at differential diagnosis can not be made in these cases, however, until sufficient material has been collected on which to found opinion by contrast and experience. It seems quite possible that the rays may eventually be found to possess some value in this direction.

The X-rays furnish a most satisfactory means of examining the chest for various purposes. The heart can be very readily seen in outline, and the facts relative to its size, exact location and movements noted at once. Sight is a much more satisfactory agent of information than hearing or touch, and consequently the opinion derived from a visual examination is much more decided than that obtained by percussion or ascultation. Aneurysm of the aorta is frequently seen in shadow, though it may exist and, if small, not be detected by this means. Areas of solidification in the lungs cast shadows more dense than the surrounding lung tissue and are hence detected and exactly outlined; any change in their size or density may be noted, too, by repeated examinations.

The abdomen has thus far proved to be a less fruitful field of investigation; the liver, kidneys and occasionally the spleen may be outlined fairly well, and calculi, if of sufficient size, located; but the many obscure affections involving the intestinal canal have not, so far as I am aware, received any elucidation by means of the rays of Roentgen.

I have made some experiments tending to ascertain whether or not the pregnant uterus can be differentiated from conditions simulating pregnancy. The results are most encouraging. After the fourth month a skiagraph of the pelvis leaves no question of doubt in the diagnosis and I am inclined to believe that gestation may be confirmed or eliminated as early as the eighth week.

The claim has been made and refuted, with about equal weight *pro* and *con*, that these rays exercise a germicidal power upon sundry micro-organisms. The question must be regarded as still open, but it is certainly very doubtful that they will be found to have germicidal properties of any magnitude. Cases of tuberculosis pulmonalis have been reported as much benefited by repeated exposures to the radiations from the vacuum tube, but whether the benefit is purely psychologic, is due to the counter irritation of the dermatitis generally resulting or is indeed the direct result of the action of the X-rays, *per se*, has yet to be demonstrated.

Not the least unfortunate of the unfounded claims made for these new rays was that they exhibited some remedial properties in cases of blindness. Edison and some of his enthusiastic followers imagined that the rays produced an effect upon vision, but no other physicist in the world, so far as I am aware, has been able to observe the phenomenon suggested by Mr. Edison; and this failure can not be assigned to inefficient apparatus, for there are many laboratories in which more intense and profuse X-rays have been and are produced than in Mr. Edison's laboratory. The error seems to have originated in a misinterpretation of the phenomena encountered.

A certain depilatory action seems to be exhibited occasionally, due partly to, in all probability, the same causes that produce the dermatitis Roentgenii. This property has been made use of in several instances for removing hairs for cosmetic purposes. Unfortunately the fact soon developed that the condition became eventually as bad if not worse than before the treatment was employed, owing to at least a return of the hairs removed and oftentimes an increased growth.

In May or June, 1896, it was first observed that a

more or less severe inflammation of the superficial tissues would occasionally result from an exposure to the emanations from the vacuum tube, and as the number of cases of this inflammatory process rapidly increased and as they all exhibited substantially the same symptoms, *i. e.*, a dermatitis of peculiar nature, the name dermatitis Roentgenii was coined. Gilchrist, in the *Johns Hopkins Hospital Bulletin*, for February, 1897, reports twenty-three cases gathered from various periodicals. Many cases have occurred and have not been reported, so that the conclusion he draws as to the infrequency of the dermatitis is hardly warranted. I have myself seen nine cases, none of which have been reported, and I have authentic information relative to several others. In some points these cases differ widely, while in other respects they are very similar. The inflammation may be mild or extremely severe, depending on the location, the length of exposure, the condition of the tube and personal idiosyncrasy. The least time of exposure that has resulted in dermatitis, so far as I know, is fifteen minutes; numerous short exposures or a single long exposure are the conditions reported as observed in most of the cases. There is usually no sensation at the time of exposure, and for from twenty-four hours to twenty-one days thereafter the skin remains apparently perfectly normal. After this period of "incubation" the skin over the area exposed to action from the tube becomes bright red, reddish brown, dark brown or almost black; the epidermis is raised from the true skin by a serous fluid (either *en masse* or in bullæ), the scarfskin separates and comes off, leaving a bright red, raw-looking surface with a profuse, sero-purulent, ill-smelling discharge. There is at this time, usually, a sense of burning pain and soreness at the seat of the inflammation, which has been preceded in many cases by a brief period of partial anesthesia. The condition grows worse for from ten days to three weeks and then spontaneously heals, in the ordinary cases. In the more severe cases the true skin may slough off leaving an ulcerative surface that is very difficult to heal. The more serious results seem to have followed prolonged exposures or fairly long exposures repeated at frequent short intervals.

Several theories have been advanced to explain this phenomenon: 1. That it is caused by ozone. 2. That it is caused by ultra violet rays (*i. e.*, ultra violet rays of known wave length). 3. That it is due to electric action by induction. 4. That it is caused by particles of matter projected from the tube. The really rational explanation seems to have been overlooked.

1. If caused by ozone, the sides and palmar surface of the fingers and hand would be affected as well as the dorsum, when the dorsum is exposed to the rays and subsequently becomes affected. Also in the experiment of Elihu Thomson, the entire area of the hand within the field of radiation of the tube would have been affected, and not merely a limited area on one finger, corresponding to a window of clear German glass in a tube of thick blue glass; the finger having been exposed to the rays from the window and it alone having been subsequently affected. Certainly in this experiment, the conditions in regard to ozone were the same for all parts of the hand. There are also many other circumstances impossible to reconcile with the ozone theory.

2. That it is caused by ultra violet rays of known wave length: the experiment of E. Thomson previously referred to would exclude this theory, for the blue glass of the tube would offer no more obstruction to such ultra violet rays than would the window of clear German glass.

3. That it is due to electric action is hardly tenable, for the reason that the electric induction is small in comparison with the electrification often induced for therapeutic or experimental purposes and that in the latter case no such effect is produced.

4. The theory that it is caused by particles of metal projected through the walls of the tube has been advanced as a result of Tesla's suggestion that the rays are themselves streams of projected particles; the theory is, however, without any evidence to support it, and indeed the mass of evidence is directly opposed to such an assumption. Certainly no "material particles" have been found outside the tube. To be sure there is no direct proof that the inflammation may not be produced in the way suggested, but Gilchrist was unable to find any trace of metal in the cast-off skin in his case of dermatitis.

The conditions entering into the production of this inflammation are: 1. An exposure of not less than fifteen minutes within a comparatively few inches of an electrically excited vacuum tube emitting X-rays; 2, the condition of the vacuum and excitation of the tube; 3, idiosyncrasy. The first and third factors are well recognized and need no explanation; the second is the factor which seems to offer a key to the solution of the problem.

The vacuum is not a constant quantity. After the current has passed through the tube a certain time, the phenomena change, the tube exhibits increased resistance and other indications of an increase in vacuum; this increase in vacuum may be due to actual loss of contained gas, as claimed by Tesla, or to a condensation of the gas upon the inner walls of the tube. The latter, for various reasons, seems the more probable theory. As the vacuum increases, the character of the emitted rays changes. Commencing with a low vacuum, the rays emitted are of comparatively long wave length and limited penetrability; with increasing vacuum, the wave length decreases and naturally the penetrability increases. In all probability the rays from the higher tubes are, however, somewhat akin to white light, in that they are made up of rays of various wave lengths. The rays of longer wave length and little penetration, are more easily absorbed and produce more markedly the effects of transformed energy than do the waves of shorter wave length and greater penetration. This may be observed by comparing the appearance of a fluorescent screen when excited by the two extremes; in the one case the screen is brilliantly lighted up, but the flesh, as well as the bones of the hand, is opaque and a shadow of the hand alone is seen; in the other case the screen is less bright, but the flesh and even, sometimes, the bones of the hand may be quite transparent; similar phenomena may be observed if the photographic plate is substituted for the screen. Absorption of radiant energy must produce some effect; we see that such is the case with the fluorescent crystals and with the photographic emulsions; I am inclined to think that the dermatitis Roentgenii is nothing more nor less than the result of this absorption of radiant energy by the cells of the skin, and is parallel to the changes effected in the photographic emulsion.

We know that radiant energy falling upon the unstable molecules of a silver bromid emulsion, produces

a rearrangement of the atoms resulting in a less complex molecule. We also know that organic cells are made up of rather unstable molecules. I can not but think that we have here to do with such a change. The radiant energy of the X-rays which are of comparatively long wave length, would be absorbed by the molecules of the first substance coinciding with their absorption band encountered, and if these molecules were unstable, they would suffer rearrangement of their atomic structure. Such a rearrangement, it is more than likely, would be, if carried far, sufficient to greatly modify the cell function and produce cell death. Apparently this is the exact condition produced, for the dermatitis shows every indication of being a superficial gangrene, and the sloughing process continues until the dead material has been cast out, when healing is spontaneous.

I have observed that dermatitis is more apt to ensue from exposure to low vacuum tubes than to tubes of higher vacuum, and that a very long exposure may be safely made, when the tube is of excessively high vacuum and the rays emitted are of great penetration. In the former case the vast majority of rays are unquestionably absorbed by the skin, whereas in the latter case but few rays are absorbed.

We should also expect, if this theory is true, to see more or less disturbance of the subcutaneous tissues following excessive exposures; and such is the case, for we find that prolonged exposure has resulted in sloughing of the true skin and underlying tissue; and that pain and soreness in and of the bones and joints has been observed repeatedly; and that cases of miscarriage in the latter months of pregnancy have followed long exposure to these rays. The evidence seems to me conclusive.

The possible danger of dermatitis or other inflammatory process, should not deter us from employing this diagnostic aid. In the vast majority of cases no untoward consequence need be anticipated, if a few precautions are borne in mind. The tube should be carefully examined and not used for diagnostic purposes when the vacuum is low; the minimum exposure necessary to secure a satisfactory skiagraph, when the tube is not too low, and the distance of the tube from the surface of the part exceeds six inches, will almost never produce a dermatitis. When the case is one requiring a prolonged exposure, or several repeated exposures, it becomes a matter of judgment, whether the urgency of the examination is sufficient to warrant the dermatitis which may ensue.

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THE FALLACIES OF X-RAY PICTURES.

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Roentgen's marvelous work on the properties of the X-rays (their nature is as yet unknown) has already been productive of much good in surgery and medicine—almost entirely in the field of diagnosis. The application of his discovery necessitates the rewriting of the text-books on fractures and dislocations. Facts, heretofore "smothered in surmise" are clearly set forth by the radiographs. For example, no writer, of which I am aware, on fractures, suspected the frequency with which fracture of the ulnar styloid process accompanies Colles' fracture; yet this frequency has been demonstrated by radiographs of Colles' fractures.

While much has been gained in accuracy of diagnosis by the aid of X-ray pictures, there is one branch of practical medicine where harm is threatened by their employment. I refer to medical jurisprudence. X-ray pictures have been already admitted as evidence in some courts. Their indiscriminate admission will hurt the cause of justice—because they can easily lead to fallacy or error. Their use as evidence of injury, is only safe when certain conditions have been fulfilled, in their taking and presentation. I shall briefly indicate further on what these conditions are.

Figure 1.

In all X-ray pictures there is distortion. The reason is X-rays emanate from a point, and are not parallel. Interference with these rays follow the ordinary physical and mathematical laws of rays emanating from a point. (Of course it is understood that there is neither reflection nor refraction of the X-ray.) Thus the nearer to their source is an obstruction to the rays, the larger will be the resultant shadow or picture; the

size of the shadow depends also upon the nearness of the object to the surface upon which the shadow falls; the further the surface from the object, the larger the shadow. If we had for a source of X-rays a surface as large as the object to be pictured, there would be no distortion, for the X-rays would be parallel. X-ray pictures in that case would be easy of comprehension, and never misleading. To read correctly the lesson of an X-ray picture, the obliqueness of X-rays must be kept in mind, and mental correction made for the disproportion and distortion caused by this obliqueness.

To illustrate the foregoing remarks, I present Figs. 1 and 2. They are plates of radiographs of the same hand, the right, of a boy 13 years of age. Before taking them, I thought that the relations of the palm and wrist lines to the underlying bones could be accurately determined by radiography. My plan was this: I covered the palm and wrist lines with pieces of copper wire. The wire was attached to the skin by means of collodion and cotton fiber. The copper wire being resistant to penetration by the X-rays would cause dark lines upon the picture, and thus I hoped to have the palm and wrist lines represented with the bones, and their relations shown. The palm and wrist lines are represented but their relations are not accurately pictured. This is proven by the plates. Fig. 1 is from a radiograph of a hand with its palm toward the sensitized plate. Fig. 2 is of the same hand turned over so that its back was toward the plate. The relation of the palm and wrist lines to the bones had not actually changed by simply turning over the hand; the pictures represent these relations to have changed, and therefore are fallacious. If our source of X-rays was so large that the rays streaming through the object were parallel, such divergence would not exist, and the lines representing those of the palm and the wrist would coincide in both pictures.

Figure 2.

Besides the want of coincidence in the palm and wrist lines in both pictures, I invite attention to the difference in size of the thumb metacarpal in the pictures. In Fig. 2 the thumb metacarpal is pictured as thicker than in Fig. 1. The pictures represent a difference in size where none exists, as both are pictures of the same bone. Hence, again, X-ray pictures are fallacious. This difference in size is explained thus: In Fig. 1 the hand was palm against the sensitized surface of the plate, and therefore the thumb metacarpal bone was nearer to the plate, than when the hand was with its back against the plate as in Fig. 2. The thumb being nearer the plate in the first position than in the second, its shadow was smaller, so pictured in Fig. 1.

Figure 3.

Besides the variations in the picture caused by the distance of the object from the source of the X-rays, and the variations caused by the distance of the object radiographed from the sensitized plate, there are variations caused by the position of the object with relation to the direction in which the X-rays strike the object. This is shown by Figs. 3 and 4. In Fig. 3 we have the bones shown thicker than in Fig. 4 and with curious spur-like exostotic deposits upon the metacarpal bones. *Both are radiographs of the same*

hand. The difference in the pictures was caused by the difference in position of the Crooke's tube when they were taken. In taking picture 3 the tube was more to the ulnar side of the hand than when taking picture 4.

In my possession is a plate in which the deformity caused by Colles' fracture is quite closely simulated by a similar change in the position of Crooke's tube. The plate is of a normal wrist. The importance of this from a medico-legal point of view need not be enlarged upon.

I have thus shown X-ray pictures to be fallacious and misleading—and described some of the causes of these fallacies.

Figure 4.

Because X-ray pictures can be fallacious, should they be excluded from court as evidence? Certainly not. It is well to know their limitations, and to remember that appearances may deceive. X-rays, properly used, are as a search-light in the exposition of bone lesions. But the lesions must be pictured from different directions, and the resultant pictures compared with pictures of the normal opposite member. Moreover the pictures of the injured member and those of the opposite normal member, must be taken with the same relative positions of the Crook's tube, the limb and the sensitized plate. Then can truth be arrived at, and truth is essential for justice.

99 Broadway.

Salicylate of Methyl in Scarlet Fever Arthralgia.—Professor Roger has secured rapid and marked improvement in the arthralgia accompanying infective diseases and especially scarlet fever, by the use of salicylate of methyl. Twenty to forty drops are applied to the articulation morning and night, which is afterward wrapped in oiled silk.—*Semaine Méd.*, August 18.

CORNEAL BURNS FROM ACCIDENTS IN THE USE OF CURLING IRONS. REPORT OF SIX CASES.

JOHN O. McREYNOLDS, B.Sc., M.D.
DALLAS, TEXAS.

This unusual form of traumatism is worthy of mention, because of the severity of the pain, the grave apprehensions of the patient and the uniformly speedy and complete recovery. In the six cases that have recently come under my observation (Mrs. W., Miss L., Miss E., Miss M., Miss L. and Miss H.) the injury was received directly upon the cornea by dropping the hot curling-iron upon the open upturned eye. The extent of the injury has varied from three square millimeters in area to a third of the corneal surface.

In the severer cases the pain has been very intense unless continually relieved by local anesthetics. The seared superficial epithelium in a few hours exfoliates in a white opaque mass, leaving beneath a denuded corneal surface, which soon becomes, under favorable treatment, re-covered with normal epithelium and within a few days the eye is perfectly well. In corneal injuries in general I should object to the employment of cocain, because of its bad influence upon nutrition, but in this form of injury, in which the pain is so excruciating and the danger of subsequent ulceration so slight, I have considered it prudent to use a weak solution or ointment of cocain or eucain to secure rest for the patient. For this particular purpose the eucain has the advantage over cocain in that it increases rather than diminishes corneal nutrition and also is capable of being thoroughly sterilized by heat. The additional indications are the frequent use of mild antiseptic solutions, the moderate employment of a mydriatic and the application of a light bandage to obtain rest and protection for the wounded eye.

GENERAL IMPRESSIONS FROM SIX YEARS USE OF THE OLD TUBERCULIN.

Read before the British Medical Association at Montreal, Sept. 2, 1897.

BY JAMES T. WHITTAKER, M.D.

Robert Koch announced the discovery of tuberculin at the Tenth International Congress at Berlin, August, 1890.

The publicity of the occasion, the fame of the author, above all the defiance of the disease to all treatment hitherto, lent peculiar interest to the discovery. The suddenness of the announcement was another factor. No one had even an inkling of the work leading up to it.

The declaration of the discovery of the tubercle bacillus in 1882, though credited by many of the members of the critical audience in the Berlin Physiological Society to which it was presented, met with so much scepticism in the profession at large as to have been practically disbelieved. Most of the leading medical journals discredited it; many of them derided it. When the truth asserted itself the disbelievers found themselves punished for incredulity. So, although the problem was harder, belief was easier on this occasion. In fact, there was reaction to the other extreme and more was expected of the remedy than was expressed in the modest claims of the author. This was the reason why medical men, who represent the most cautious and conservative branch of human culture, accepted the remedy at once

and began to experiment with it in a way and in cases in which the author, to use the mildest terms, had never advised it.

The disappointment which followed was intense and the expression of it was not without bitterness. In fact, we have just now reached a period when any renewed advocacy will be listened to at all.

One of my former students brought me directly from Berlin a small quantity of tuberculin, Jan. 15, 1891, as the very first importation into this country, and with this specimen I began the use of the remedy in the cases at the Good Samaritan Hospital at that time. These were four cases of tuberculosis pulmonum and one case of scrofula, to which I will allude again.

My first use of the remedy was entirely therapeutic and I did not begin to avail myself of the immediate action of it in diagnosis for two or three years. When it was used in this way the results were found, it is needless to say it, much more striking and satisfactory. The use of tuberculin should be studied, therefore, from the double standpoints of diagnosis and treatment.

The value of it in the disclosure of tuberculosis in man was not at once rightly recognized, on account of alleged dangers in the use of it; but in cattle it soon met its proper appreciation, and is perhaps nowhere more extensively and satisfactorily used than in the United States.

Aside from the objections urged by ignorant and prejudiced people, not worthy of notice, four apparently valid arguments accumulated in the course of time against the use of tuberculin in man.

1. That the reaction occurred in the absence of tuberculosis. This objection has been met by the demonstration of concealed depots.

2. That the reaction occurs in other diseases, syphilis, lepra, actinomycosis, etc. This objection has been met by the demonstration of tuberculosis coincident with or complicating these maladies.

3. That the reaction will occur in the most quiescent case even where the bacilli are not only concealed but encapsulated and depots are partly calcified. This is no objection at all, but a most striking confirmation.

4. That the use of it is dangerous; that it not only awakens the disease from latent sources but disseminates it over the body and thus leads to auto-infection and increases the danger of infection of others. This conclusion rests on a false premise and confounds the *post* with the *propter hoc*.

I will not take the time to further discuss theoretic objections but content myself with the repetition of a statement, made on another occasion, that I had used tuberculin every day in hospital and private practice for six years in now nearly one thousand cases and have never seen any kind of evil result beyond the characteristic reaction. Koch himself declares the fear of danger to be a "foolish prejudice." He says he has never seen "even the slightest intimation of any mobilization or transfusion of tubercle bacilli" in the use of tuberculin as a diagnostic agent in over one thousand cases, and this experience he thinks "should put the diagnostic value of it in man on the same plane as in animals." My own use of tuberculin has been nearly exclusively for therapeutic and only exceptionally for diagnostic purposes.

In a paper read before the Association of American Physicians in May and published in the "Transactions," I reported a number of cases, doubtful and obscure, in which the diagnosis, positive and negative, so far as tuberculosis was concerned, had been easily established and mostly after failure with other means, by a test dose of tuberculin; thus in cases of neurasthenia, nightsweats, joint disease, laryngitis, pulmonary tuberculosis, peritonitis, fistula, etc. Since this report I have had a striking illustration of the penalty which attaches to over-confidence in diagnosis and neglect of using the most approved method of study. This will be the only case which I will report. June 10 I was called in consultation by Dr. D., a good surgeon in Cincinnati, to aid in the diagnosis of a case of enlarged glands in the neck in a patient, a woman, aged 67. The glands had begun to grow three months before and now formed a good sized mass under the angle of the right jaw, extending down behind and below the sternomastoid muscle. There was some pain, and within the past few weeks there had been slight fever. The glands were deep-seated and hard. The patient had enjoyed good health hitherto and had no other discoverable disease. The rapidity of the growth, the presence of pain, the exemption of any affection of the lungs, above all the age of the patient, led us to declare a diagnosis of carcinoma, probably sarcoma of the cervical glands, and to advise immediate extirpation. The operation was tedious and bloody (as had been expected) and the patient succumbed in three weeks. I learned these things by letter from the surgeon, together with the fact that the glands upon microscopic and bacteriologic examination turned out to be tuberculous. Now, although extirpation is often the best treatment of an adenopathy of this kind, I should myself with a true knowledge of the disease have advised against an operation in this case at that time.

The mode of action of tuberculin, to which I allude merely from a clinical standpoint, has met with various explanations. Certain it is that together with leucocytosis and fever a sharp hyperemia is developed extending over the entire domain affected, and in this process toxins are formed or liberated which produce the characteristic reaction and give partial immunity to the poisonous products of the tubercle bacillus. The immediate benefit which nearly all patients feel is due to this immunity. The proper principle of treatment consists in pushing the development of this toxin as rapidly as possible this side of extreme reactions, before tolerance to the tuberculin itself is established in the body. Most of the protection of the body against the action of poisons is based, as we know, upon tolerance, which is probably secured by increasing the antitoxic action of serum of the blood. The patient affected with tuberculosis is not fatally poisoned by the products of the tubercle bacillus because of tolerance to the products of it begotten in this slow development. When these products are developed too rapidly the body is overwhelmed and succumbs. But the tolerance to tuberculosis as a rule is so great that individuals live for years and decades of years, and often recover entirely. The body becomes adjusted to the effects of the poison and sometimes shows in this process remarkable changes. Thus the disposition may be actually improved by it. It was Klebs, who makes anyhow such close and curious observations, who first spoke of the singular sweetness of disposition and loveliness of character sometimes seen, especially in women, the sufferers with slow phthisis. Men, it seems to me, are rather made more

irritable. The true principle of treatment with tuberculin is to secure the action of it before tolerance to it is established, for so soon as it is tolerated it loses its effect. Unfortunately there is as a rule, not time to secure immunity to the products of the tubercle bacillus before this tolerance to tuberculin is established, and so the benefit experienced at first is lost in the later treatment. For with tolerance the toxin ceases to increase the antitoxic action of the blood, and any continued use of it after this time seems really to lessen it. So when the tuberculin fails to do good and the disease reasserts itself, the use of the remedy should be stopped. Time should then be allowed to lapse, several weeks being required in most cases, and then when the tolerance is lost the treatment should be begun again. Thus the successful treatment of tuberculosis takes time, a long time, months and years, about as long as does the successful treatment of syphilis, which is usually a matter of years. The physician who expects to cure a case of tuberculosis in a few weeks will soon become discouraged and will probably join the ranks of medical men who denounce and decry the means.

The first dose for the case of lightest infection (suspected) should be 5 mg., the second 10 mg. or one centigram, the third two centigrams. These doses may be given on succeeding days, or better, every other day, preferably in the evening that the temperature records may be properly observed on the following day. Failure to get reaction from three tests excludes concealed tuberculosis. The crude tuberculin diluted one hundred times preferably with a 0.5 per cent. solution of carbolic acid, makes a 1 per cent. solution of which one interspace of the Koch syringe represents one centigram. One interspace of this 1 per cent. solution diluted ten times makes a milligram. For therapeutic use I begin with one-tenth of a milligram.

In my first use of tuburculin I was able to adhere rigidly to the rules laid down by Koch, but I was not able to select the cases or to limit myself to the first stages of the disease, the phthisis incipiens. In fact, every one of the cases of lung disease was advanced to what is commonly called the second stage, phthisis confirmata, and one of them was so far advanced as to constitute a phthisis consumata. The remedy was used in this case in infinitesimal dose, simply *ut solaminis causa*. The case of scrofula ultimately, *i. e.* in the course of two years, made a good recovery, while the cases of phthisis pulmonum all died in from four to six months. It was impossible not to feel disappointed and somewhat discouraged at the result. But on comparing subsequently the course of similar cases treated with tuberculin with other cases, it was seen that the process of the disease was slower in the first cases; for, some improvement pretty much always sets in at first. We had however nearly uniform results to report in hospital practice, an improvement for a time with subsequent continued progress downward interrupted with many stages of quiescence and occasional temporary gain. In explanation of the temporary improvement it became plain to see, as cases multiplied, that after making all allowance for the all-powerful influence of suggestion, and some for the better hygiene of hospital life, there was still room for much to be granted to the specific treatment.

It was a long time before the reason of the continued progress of the disease was ascertained, but it became apparent at last, with continued examination of the sputum, that direct product and derivative of the disease, the closer examination of which had led to the discovery of the tubercle bacillus to constitute the luminous epoch in the history of the disease. But all attention had been directed to the detection of this bacillus in the sputum hitherto, to the neglect of other micro-organisms. As examinations multiplied in competent hands it was soon seen, or perhaps I should say, the facts already known became better appreciated, that the new advances or relapses marked by chills and sweats were due to invasions of other, especially of the pus-producing, micro-organisms, and that the disease had passed beyond the domain of tuberculosis into the wider realms of sepsis. It was at this time that the school of Koch proposed to call the seesaw temperature of hectic the streptococcus curve. The reason of the failure of tuberculin in the further course of the disease now became apparent. It was not to be expected that tuberculin, a product of the tubercle bacillus, would inhibit the growth of or destroy the influenza bacillus, the diplococcus or the pyogenic micro-organisms. The truth is, the great majority of cases in hospital practice are advanced beyond the stage of pure tuberculosis. They are cases of mixed infection or sometimes of secondary infection and belong not so much to tuberculosis as to septicemia.

The results of the use of tuberculin in private practice are more encouraging. In ordinary house practice cases are encountered in every stage, and the majority, because of the long duration of the disease, are advanced to the second stage, but the hygienic environment is better as a rule, that is, there is more breathing room, more outdoor life, including here the advantage of change of climate, more comfort in every way; as a rule to which there are many exceptions there is less auto-infection and less homesickness, and all that without saying goes with gregarious man. I had the influence of this factor impressed upon me once by the remark of a big, strong-looking man, who came back from Colorado too soon, with the apology: "Doctor, I am going to stay home; I had as leave be buried under the ground as on top of it."

But the advanced cases in private practice in the long run took the same course. The disease, after a temporary check, would reassert itself with chills, often of origin sudden and inexplicable, with hectic, night sweats and final dissolution. But every now and then there were agreeable surprises. The progress of the disease would be checked for a longer time, or the whole condition would be raised to a higher level, that of several months or several years before. In these cases the bacilli would diminish and sometimes disappear altogether and the gain in spirits, which is quick in phthisis, the *spes phthisica*, would exceed the gain in weight.

Just in which cases this gain would occur or in which it would fail to show itself could not be foretold. As in so many other things, it was necessary to try to find out. Sometimes it would be impossible to know whether the improvement was really due to the tubereulin or to conjoined treatment, but as time advanced and cases multiplied the feeling would grow that the cases treated with tuberculin off and on, more especially for a long time and judiciously, that is, with the same caution as in the use of any other agent in the materia medica, that these cases did the best. It was always easy enough to study control cases in patients who were themselves, or had been

by their physicians, prejudiced against the use of it.

So that when the diagnosis was clear, as established in a plain case by the physical signs, in a doubtful case by the discovery of the tubercle bacillus, or in a still more doubtful case by a test injection of tuberculin, I made it a practice to use it tentatively in every case, with the consent of the patient, never without it, and then continue with it or abandon it according to the results.

Some of the differences in results could be pretty definitely attributed to the kind or degree of the mixed infection, some to the localizations elsewhere in the body and some to the site of the original deposit. For instance, influenza cases, *i.e.*, cases complicated by influenza, do badly as a rule. Caries of the vertebræ, of the tarsus or carpus make ugly complications, while deposits in the pulmonary veins or thoracic duct or irruption into these vessels inundate the body to produce phthisis florida and miliary tuberculosis. We recognize these cases often after a very short examination and appreciate at once their ominous character. The continued feeding of the body from these depots makes futile every kind of therapy until more exact localization may be effected, perhaps by some kind of penetrating light, and destruction or extirpation become possible by galvano-therapy or by the knife. At the present time they constitute the despair of medicine, and the use of tuberculin is actually contraindicated in them. I know of no other contraindications.

The best results are obtained in office practice; in the first place in the way of diagnosis. It is a great satisfaction to be able to clear up a concealed case and to declare an exact diagnosis of a disease treated hitherto without a diagnosis or for something else. Thus an obstinate or frequently recurring dyspepsia, an amenorrhea, a neurasthenia, an anemia, a rheumatism, an adenitis, a little low fever (to say nothing of acute cases of chills, night sweats, catarrhs and coughs), may have their true nature revealed in this way. These are the cases (aside from the chills and fever) in which treatment furnishes the best results. Tuberculin gives good results also in childhood. Children react favorably to tuberculin, much more so than adults, so that the so-called apex catarrh of childhood will often clear up and disappear in them within three weeks.

Aside from these cases the treatment must be persistent and good judgment must be used in dosage; rather too little than too much. I have never seen any bad results from the use of tuberculin, because I always endeavored to secure a slow tolerance, so that individuals who react at first to a few milligrams become later insensitive to one hundred times as much; in fact, at last to one thousand milligrams. The evils ascribed to it I believe to be due to the disease itself, for I have seen them oftener before the use of it. But it is easy to conceive that the patient would suffer under excessive reactions and that repeated excesses might do permanent harm. But, *ex abusu non arguitur ad usum.* It is a maxim of the law, good also in medicine, that we may not from abuse argue against use.

The highest value of tuberculin is the diagnostic value, which is supreme, and which enables us to distinguish the disease at the start as a tuberculosis before the development of sepsis or other complications which go to make up that composite picture we call phthisis.

THE PHYSIOLOGY AND THERAPEUTICS OF THE THYROID GLAND AND ITS CONGENERS.

BY H. GIDEON WELLS, PH.B.
CHICAGO, ILL.

(Awarded the L. C. P. Freer medal, Rush Medical College, 1897.)
From the chemic and pathologic laboratories of Rush Medical College.

(*Continued from page 904.*)

After having tested all the materials used, as to their purity, familiarity with the method was obtained by adding to pure gelatin, known quantities of iodid of potassium and going through the process repeatedly. At first an open crucible was used and it was found to be impossible to regain more than one-half of the iodin. It is probable that in this case iodic acid compounds were formed in spite of the excess of the alkali, since this loss disappeared on the substitution of a covered silver crucible. (A platinum crucible can not be used since this metal is attacked by caustic alkalies.) Another source of loss occurs on the addition of the acid to the filtrate. This must be done in a flask with a small mouth and the acid added very gradually, otherwise there is loss through effervescence. By observing these points it was possible to obtain at least nine-tenths of the original amount, which was the same limit of accuracy that Baumann claimed to reach. During the fusing it is necessary to prevent the contents of the crucible coming in contact with the lid, since in these cases no matter how carefully the deposited material was removed, the loss was always greater than could be readily explained even by considering all that touched the lid as lost.

The first series of actual analyses was made on people who, according to the history sheets, had lived at least some years in this city, who had not received iodin for at least some time before death, and whose glands appeared to be in every way normal. Twenty such glands were analyzed, the results and the main features of each case being shown in the following table:

	Sex.	Age.	Cause of Death.	Weight of gland. Grams.	Iodin p'r gram. Mgrs.	Total mgr. Iodin.
1	M	45	Chronic nephritis	2.60	2.86	7.47
2	M	60	Brain tumor	4.39	2.64	11.75
3	M	60	Tubercular peritonitis	2.59	1.67	4.33
4	M	35	Pneumonia	3.88	2.58	10.00
5	M	35	Peritonitis	3.84	2.66	10.21
6	M	45	Pneumonia	10.59	0.99	10.47
7	M	44	Pneumonia	6.33	1.52	9.62
8	M	28	Endocarditis	3.71	2.74	10.17
9	M	26	Liver abscess	4.47	2.58	11.53
10	M	46	Chronic nephritis	5.16	1.82	9.41
11	M	30	Appendicitis	5.79	1.98	11.46
12	M	28	Pulmonary tuberculosis	4.88	2.28	11.15
13	M	49	Carcinoma of stomach	3.77	1.98	7.46
14	M	30	Multiple endotheliomata	9.68	1.82	17.62
15	M	35	Acute nephritis	6.66	1.52	10.12
16	M	41	Chronic nephritis	6.53	1.98	12.83
17	F	25	Syphilitic myelitis	5.44	1.82	9.90
18	M	26	Pneumonia	9.01	1.98	17.84
19	M	60	Meningitis	5.24	1.52	7.96
20	M	65	Pneumonia	4.10	1.22	5.00
			Average	5.37	2.10	10.79

We find here a most surprising difference from the results obtained by Baumann, especially in his Freiburg series. While each gland averages in weight less than two-thirds the weight of the Freiburg glands yet each gram contains just six times as much iodin, and the total amount in each gland is over four times as much. Even in comparison with the Berlin series the difference is still greatly in favor of the Chicago glands, which contain over twice as much iodin in

each gram, and over one-half more in the entire gland.

In interpreting these results we must consider that, in natives of Chicago, goiter is an even less common affection than it is in Berlin. Accepting this fact, the figures bear out the belief that the amount of iodin is inversely proportional to the amount of goiter in any given district. The effect of chronic diseases in reducing the amount of iodin contained in the gland, which Baumann mentioned, is not corroborated by this table, for the cases of chronic diseases, Nos. 1, 8, 9, 10, 12, 13 and 16 show an amount of iodin fully up to the average. It will be noticed that the glands of people 60 years of age and over, Nos. 2, 3, 19 and 20, with one exception, are much below the average, and it would perhaps have been better not to have used glands from people past middle life. The lowest proportion of iodin obtained in any one gland was 0.99 mg. to each gram (case 6) but it was in the largest gland in the series, so that the total amount in the gland was almost exactly the average. In general it can be stated that the weight of the gland is inversely proportional to the amount of iodin in each gram, and this rule applies to most forms of goiter. Thus it would seem as though it were necessary to keep the total amount of iodin in the gland at a certain standard, and that lessening the proportion of the iodin in the gland caused an increase in the size of the organ to make up in quantity for the lack of quality.

Two glands were omitted from this series because of their exceptionally high iodin content, which made it impossible to consider them as normal. Neither of these people had taken iodin, at least during their last illness. They were:

1. Man, 45 years of age, dying from hypertrophy and dilatation of the heart. Gland contained 34.1 mg. of iodin, weighed 6.7 grams, and in each gram was 5.09 mg. of iodin, the largest proportion obtained in any gland.

2. Man, 33 years of age, dying from a tumor of the brain. The gland contained 30.28 mg. of iodin, weighed 8.65 grams, and contained in each gram 3.5 mg. of iodin.

The following table shows the result of the analyses of the glands from babies and children:

	Sex.	Age.	Cause of Death.	Weight of gland. Grams.	Iodin p'r gram. Mgrs.	Total iodin. Mgrs.
1	F	term.		0.135	traces.	traces.
2	M	term.		0.465	traces.	traces.
3	F	term.		0.73	traces.	traces.
4	M	4 wks	Lobular pneumonia	0.68	0.11	0.076
5	M	4 wks	Meningitis	0.18	0.42	0.076
6	M	4 yrs.	Diphtheria	0.58	0.92	0.532
7	F	7 yrs.	Phthisis	1.61	1.98	3.19

This series is short because of lack of material, but it is still very significant. In the first place, even in stillborn children, traces of iodin, representing amounts not over 0.03 mg. were obtained in every case, while Baumann failed to find it in the great majority of Freiburg children who had lived even several months. The constant increase from traces in new-born children to estimable quantities in the children that had lived a month, and to relatively considerable amounts in children of four and seven years is also very interesting. The rather marked increase in the iodin, after but a few weeks existence, suggests the probability that the thyroid of the mother performs the functions both for herself and the child. In support of this idea are the facts that the thyroid increases in size during pregnancy, and also that up to the time of birth the gland of the child contains but little colloid; and also, Halsted has observed, in pregnant, partially-thyroidectomized bitches, the symptoms of athyreosis, when not present before, appear soon before parturition and disappear soon after.

A series of twelve normal glands from Boston and New York was also analyzed. As in the other series the analyses were all made in duplicate, and the results were not accepted unless they agreed closely. In this series one gland was not included. This was from a man 55 years of age, cause of death not known, weight of gland 5.99 grams, amount of iodin in each gram being 4.79 mg., total amount of iodin in the gland 28.69 mg. The other results were as follows:

	Sex.	Age.	Cause of Death.	Weight of gland. Grams.	Iodin p'r gram. Mgrs.	Total iodin. Mgrs.
1	M	30	Phosphorous poisoning	5.48	2.36	12.93
2	M	45	Suffocation	3.65	4.94	18.03
3	F	40	Pneumonia	4.43	1.90	8.42
4	F	25	Appendicitis	3.84	2.58	9.13
5	M	55	Pneumonia	4.77	1.90	9.06
6	F	40	Pneumonia	3.54	4.56	16.14
7	F	60	Chronic nephritis	3.81	2.13	8.12
8	M	60	Pneumonia	3.47	1.44	6.86
9	F	35	Mitral stenosis	6.37	2.20	14.01
10	M	47	Poisoning	3.44	2.51	8.63
11	M	25	Pneumonia	4.65	2.74	12.74
12	M	55	Meningitis	6.18	2.66	16.44
			Average	4.47	2.64	11.80

It will be observed that while the individual glands show much greater variations in their iodin content than do those in the Chicago series, yet the average amount for each gland is but a little higher. The average weight of each gland is about one gram less, but the amount of iodin in each gram is somewhat higher. In two of these cases the proportion of iodin is very large, approaching 5 mg. to each gram, while the largest amount in the Chicago series was but 2.86 mg.

On account of the great variations in the total and proportional amounts of iodin in the glands of this series, the writer does not believe that he is justified in drawing any conclusions from this table, beyond that, that in all probability the iodin content in Chicago is about as large as in glands from the seacoast. Fortunately there are on hand several more glands from the same source, and these will be analyzed and the results added to the same table. In the time available for this work it has not been possible to finish this series, nor even to touch the glands from other localities, for even with the colorimetric method quantitative determinations of iodin can not be made with great rapidity and be of value. However, the work on this subject will not be stopped with the completion of this paper, but the material on hand at least will be utilized, and if the results are of sufficient interest a paper on this feature of the work alone will be prepared.

Physiology.—Up to the time that Schiff and Horsley proved that the thyroid gland was an organ necessary to the well-being if not to the life of its possessor, many theories, mostly founded upon mere supposition and without any experimental basis whatever, had been advanced by physiologists to explain its purpose and part in the animal economy. These theories were generally discarded, however, after a brief investigation, as not completely meeting the indications. Since the time that the epoch-making discoveries

referred to, pointed out the direction in which all further efforts should be directed to obtain results of value, a vast amount of experimental evidence has been produced from innumerable sources, which has thrown an entirely new light on the subject, yet has merely supplanted old theories with new. However, this difference does exist; the theories now under consideration are based upon facts obtained as the result of the work of careful investigators along the lines of experimental physiology.

Before considering these theories, it will be well to set down the chief facts that we now possess, and which must form the basis upon which we found our consideration of these ideas. Practically all our knowledge of the action of the thyroid gland is based upon the changes observed in man and animals when they are under one of two conditions, which are:

1. When the animal is receiving less than the usual amount of secretion from the thyroid, as in extirpation experiments.

2. When the amount of secretion in the body is above normal, as when the thyroid extract is being administered.

These two headings include not only the results obtained by experiments, but also those obtained from clinical observations, since here the symptoms are due to a hypo-activity, *e. g.*, myxedema and cretinism; or possibly sometimes to hyper-activity, *e. g.*, exopthalmic goiter.

In the first case, when the subject is not receiving the full influence of the thyroid gland, we observe a series of symptoms that can be classified as *a*, nutritional; and *b*, nervous.

a. The nutritional changes seem to be of such a nature that the metabolic changes throughout the tissues do not proceed to their full extent, and the power of reproduction of the cells is altered. As a result of the first the connective tissues stop in their metabolic processes just short of completion, leaving them, as Semon has suggested, in an embryonic condition, that is, in the form of myxomatous tissue which is their embryonal representative. From this cause occurs the peculiar condition of the skin observed in people suffering from loss of functional activity or from removal of the thyroid, which gives to this condition its name, myxedema. This change is not confined to the subcutaneous connective tissue, but is a general change, for Halliburton has shown that in the blood of monkeys which were in a myxedematous condition as a result of thyroidectomy there is demonstrable a considerable quantity of mucin. Because of the failure of complete reproduction, or through some alteration in the process, we observe a change in development in young animals, quite analogous to the condition in children that have not possessed an active thyroid, known under the name of cretinism. Besides this there seems to be some alteration in the gas exchange of the blood, since in thyroidectomized animals the amount of carbon dioxid is increased and the oxygen diminished until the arterial blood may be below the normal venous standard.

b. The nervous system is apparently greatly affected, the most marked symptoms from this source being those due to the excitation of the muscular fibers, viz., twitching, tremors and spasms. These undoubtedly proceed from the lowest centers, since Horsley has observed them in monkeys subjected to ablation of the motor cortex, and Munk found that they were not affected by division of the cord, while Schiff has proven that they are not of peripheral origin since they are completely arrested by section of the motor nerves. Later these symptoms are followed by a lessening of the power of a voluntary action, as well as loss of sensation, which result in the lethargic condition so well illustrated by the cretin. The thermotaxic apparatus is also affected, so that the body temperature falls to three or four degrees below normal. Lorrain Smith has observed that the reaction of thyroidectomized animals to changes of temperature is abnormally rapid, so that in such an animal exposed to cold an increased production of carbon dioxid begins immediately, instead of being delayed for some time as in normal animals. Moreover it is noticed that many of the symptoms of athyreosis are alleviated by artificial heat. These nervous symptoms may be due to alterations in nutrition, either directly affecting the nerve cells, or producing secondary changes in them through degeneration of the nerve centers.

In the second case, when the thyroid preparations are administered to animals experimentally, or to man therapeutically, effects are produced which are quite different from those described above, as would be expected, yet they can be separated into the same two classes.

a. Nutritional: The process of metabolism throughout the body undergoes a marked change, which is shown best by the urine. This is considerably increased in quantity, it contains a greater amount of urea, as well as chlorids and phosphates, as has been shown experimentally by Roos, and clinically by Napier and others. At the same time the weight of the subject diminishes, more particularly if it be above normal because of fat deposition. This decrease in weight is constant and considerable, and Wendelstadt has been able to demonstrate that but one-sixth of the loss can be attributed to the nitrogenous compounds as shown by the increased nitrogen content of the urine, the rest being due to loss of water and of the fat itself through increased oxidation.

b. Nervous: Of these the most prominent clinically is the palpitation of the heart, which is a certain indication that the dosage has been carried too far. With it come headache, nausea and vomiting, and if the remedy be pushed still farther the pulse and heart weaken to a dangerous degree. Sometimes glycosuria is produced, which can be attributed to some action on the diabetic center since it may develop into a true diabetes mellitus. Schäfer has also shown that if thyroid extract be injected into the veins of healthy dogs there follows an immediate fall of blood pressure without any considerable change in the rate or force of the heart beat, due to dilatation of the vessels throughout the body.

With these facts as a basis the theories that may be found in text-books and articles on the subject may be critically considered. They may be enumerated as follows: 1. An adventitious organ without function. 2. To give form to the neck. 3. Having mechanically some influence on the voice. 4. Acting as a cushion to prevent injury to the structures of the neck. 5. Regulator of the blood supply of the brain. 6. Having a controlling influence over sleep. 7. Having some connection with the sexual apparatus. 8. Having control over respiration. 9. A blood-building or blood-destroying organ. 10. Influencing the quantity of mucin in the body. 11. Having some connection with senile changes. 12. Producing some

substance neutralizing the toxic materials in the system. 13. Producing some substance necessary for the metabolism of the body.

The first four of these theories will be found only in some of the older text-books, and of course are only attempts to account for the presence of this mass of tissue in the neck without any obvious function.

The fifth and sixth are practically the same, it having been supposed that the gland by its swelling produced pressure on the carotids (Maignien), or that the vessels in the gland became greatly dilated on certain occasions, and so the blood instead of going to the brain became side-tracked, as it were, and so regulated the cerebral supply. This theory also received a supposed confirmation in the fact that in exophthalmic goiter, in which the vascularity of the gland is greatly increased, there are many cerebral symptoms. These theories, however, are entirely negatived by the results of removal of the gland.

The seventh theory is founded on the following observations: The thyroid gland becomes greatly enlarged during menstruation; it also enlarges during sexual excitement; goiter most often develops at puberty and at the menopause; goiters increase in size at delivery and decrease a few days after; exophthalmic goiter improves after delivery; the thyroid gland atrophies at the climacteric. Still the writer has failed to find any references to loss of sexual appetite or change in the sexual conditions in diseases of the thyroid or after its removal. Also a case of pregnancy in a cretin has recently been reported by Townsend. It may be here remarked that diseases of the thyroid gland show a special predilection for the female sex. Fischer has collected statistics showing that from 80 to 90 per cent. of all cases of goiter and 86 per cent. of the cases of myxedema, occur in women, while exophthalmic goiter seems to attack the same sex chiefly. Halsted has three times observed pregnancy in bitches that had lost portions of their thyroid glands, impregnated by dogs in the same condition. These bitches showed none of the symptoms of athyreosis (not having lost a sufficiently large part of their glands) until just before giving birth to their litters. Then the symptoms became very marked, but disappeared soon after parturition. What is especially remarkable is that in every case the pups had thyroid glands many times the normal size observed in pups of the same weight.

The eighth hypothesis is also an old one based upon the increase in size of the gland noticed during forced expiration, as in asphyxia, and also in animals when breathing rapidly, as dogs returning from the chase. The dyspnea of goiter, which could not always be explained as due to pressure, was considered as offering corroboration to this theory. It is probable that the increased respiratory movements observed in thyroid diseases and in thyroidectomized animals are due to the fact alluded to previously, that the gas exchange is so altered that the oxygen standard is reduced to below normal, so producing an asphyxiated condition of the respiratory center, and resulting in a stimulation of the respiratory muscles. That this is the probable explanation has been demonstrated by Schiff, who was able to reduce these symptoms by artificial oxygenation of the blood. The increase in size can readily be explained by the increased blood pressure that is always produced by the high intra-thoracic pressure during forced respiration.

In confirmation of the ninth theory we have the experiments of Horsley, who found that in thyroidectomized monkeys the red blood corpuscles diminished steadily until they reached an oligemic equilibrium, which was maintained until death, and also that in the thyroid veins the leucocytes were more numerous than in the arteries passing to the gland, or in the vessels of the limbs. In regard to this last fact it is to be remembered that lymphatic tissue is constantly found in the thyroid, and often-times thymus rests. The anemic condition observed in athyreosis can be best explained by the theories to be described later. In the acini of the gland red corpuscles are often found imbedded in the colloid substance, but they seem to be in a state of degeneration, although Bozzi observes that they retain their form and size for a longer time than is usual in extravasated blood. The increase in mucin in the blood after removal of the thyroid, observed by Halliburton, is probably due indirectly to the thyroid through its effects on the connective tissues. The increased venosity before mentioned may be ascribed to a change in the respiratory function, or to a change in the chemic condition of the hemoglobin so that oxygen is less readily taken up.

As to the tenth theory there can be no doubt that the removal of the thyroid gland does increase the amount of mucin in the body, and it has been suggested that the gland forms some ferment which is able to break up the mucin into some other bodies, a lack of this ferment in myxedema causing an accumulation of mucin in the tissues. However, all attempts to isolate such a ferment from the gland have failed, and all attempts at demonstration of this theory have been unsuccessful.

It is a constant observation that the thyroid gland is greatly atrophied in advanced years, and on this the next theory is based. As was shown in the writer's cases the weight of the gland in people over 45 years of age was but two-thirds of what it was in those under that age. While this theory becomes absurd if we take it as meaning that if senile changes are due solely to a lessened capacity of the thyroid, one might escape old age forever by taking thyroid extract, yet it has some weight. In the first place perhaps the most serious change in senility is arterio-sclerosis, and a thickening of the intima very similar to that in the above pathologic condition has been described as occurring constantly in the vessels of the thyroid gland of young and healthy people. And again, the most marked changes observed in athyreosis are due to alterations in nutrition, in which function this organ seems to play a great part, and it is probable through failures in nutrition that the body reaches the wasted condition accompanying old age.

We now reach two theories that have grown out of exhaustive studies of the thyroid during the last few years, each with its advocates and much evidence in its favor. The first of these is in direct relation to the modern theories of auto-intoxication. It presumes that constantly during life the tissues are producing substances as a result of their metabolism, lower chemical forms derived from the complex proteid molecule and which accumulating in too large quantities through some failure of excretion, destruction or neutralization, are poisonous to the organism and produce symptoms of various kinds. With these substances may possibly be included toxic materials produced by fermentative processes in the alimentary canal and taken into the system. To meet these undesirable materials it is presumed that the gland

produces the thyroiodin which is circulated through the system and meeting the toxic substances as soon as formed neutralizes them, perhaps by causing their decomposition in a ferment-like manner, perhaps by uniting with them and producing innocuous compounds. It is very easy to imagine the thyroiodin playing such a role as this, especially when we consider the general precipitating action of iodin on all alkaloids and alkaloid-like bodies, in which condition we generally consider the toxic substances as existing in the body. Or again it may be supposed that this action merely occurs in the cells of the gland itself while the blood is circulating through it, and independently of any true secretory action. The gland failing in the performance of its function, these noxious substances accumulate until they cause disturbances in the organism, resulting in the condition known as athyreosis. In confirmation of this view it has been shown that if the blood of an animal suffering the symptoms following thyroidectomy be injected in another animal, especially if it has previously had its own thyroid removed, that it is toxic to this second animal and all the classical symptoms of athyreosis are immediately produced even if there were no indications of them previously. On the other hand we have the effect of thyroid extract on blood pressure, which is unquestionably due to a specific effect of the extract itself since it is produced in animals having a perfectly healthy and active thyroid, and so can not be attributed to any neutralization of other substances. However it may be that this action is due to the extractives of the gland outside of its fundamental principle, Schäfer having used ordinary glycerin and aqueous extracts in his experiments upon this point. Still it seems to the writer that the symptoms of thyroid deprivation are of too definite a nature to be produced by the action of the tissue toxins which must necessarily, judging from our knowledge of the complexity of the chemistry of cell metabolism, be many and varied. And again the manifestations of myxedema and cretinism, and the athyreotic conditions generally seem to reach a certain degree of intensity and there remain, rather than progress as one would expect from a constant accumulation of the substances causing them, which must occur if they be non-neutralized products of tissue metabolism. It might be argued that some other organ takes up the role of the absent or functionless thyroid adventitiously after these conditions reach a certain intensity, yet if such be the case why does it not entirely obviate them, or why do they so often progress even to a fatal termination without compensation.

The second of these last two theories is entirely different from the first, for it relates to the conditions producing normal metabolism and entirely disregards the noxious products of cell activity. It suggests that for the proper performance of their function the cells must receive in addition to the ordinary food materials carried in the blood and with which we are familiar, a certain body or bodies without which their action is perverted or abortive, just as it is necessary for the production of a clot that calcium salts be present. As a result of this in the young and developing animal when the cells fail to receive their full complement of thyroiodin, if this be the essential substance, some of them, at least, do not multiply exactly as they would have done otherwise, and we get the condition seen in cretinism. Similarly in the adult the connective tissue cells in their reproduction do not get beyond the embryonal or myxomatous condition, and the tissues are left as we see them in myxedema. Following out the same line of reasoning the increased amount of excretion by the urine and the dimunition in the weight of fleshy subjects can be explained by the statement that not only is the thyroid principle necessary to metabolism, but an increased supply results in an increase in metabolism, which naturally causes the described changes. And further this overstimulation results eventually in the palpitation of the heart and the other symptoms accompanying it, while a lack of stimulation produces a lessened or altered nervous activity with the changes resulting therefrom, notably the ultimate loss of sensation and control of voluntary motion, as well as the failure of the thermotaxic apparatus. While it must be admitted that the last statements are rather broad, still they are hard to gainsay, and they serve well to cover the ground until further experiments give us more definite information. It must also be mentioned that they do not explain the vaso-dilator effect, which would seem to be too rapid and transitory to be the result of cell metabolism. Neither is the change in the ability of the blood to exchange oxygen for carbon dioxid explained satisfactorily by this theory.

Acting on the basis of the last two theories we can consider that the changes observed in the thyroid gland during pregnancy, at menstruation, etc., are due to hyperactivity in an attempt either to neutralize an unusual amount of toxic substances or to furnish the stimulus necessary for a general increase in metabolism occurring at this time. They explain the changes in the blood in athyreosis as due to the destruction of its elements by poisons, or to a lessened activity in the blood-forming tissues. The myxomatous condition can be ascribed to Semon's theory of incomplete metabolic changes or to a mucoid degeneration due to saturation of the tissues with the injurious products of metabolism. So it is apparent that one may work from either theory and explain the facts upon which all the others are based, and still leave it an open question as to which of the accepted hypotheses is the nearer correct.

Therapeutics.—In the beginning of this article the history of the therapeutic use of the thyroid was followed up to the time that Mackenzie and Fox introduced the method of administration, by the mouth, of gland extracts or of the gland itself. At this time the the practitioner in treating a case with the thyroid was obliged to rely on the nearest butcher for glands which were given to the patient fresh, partly cooked, or a glycerin extract was made that could be kept for a short time. Soon it was found that the glands could be desiccated and a powder made which retained the full activity of the gland, and from this it was but a step to the preparation and marketing of tablets made from the desiccated glands, in which form it is now almost exclusively used, in this country at least, on account of the greater convenience. The great disadvantage of the tablets is their extreme variation in activity, since by chemic analysis it is seen that one gland may contain in an equal bulk fully five times as much of the active principle as another. Also there is the ingestion of the residual animal material, of which there is no gaurantee as to purity or freedom from disease germs, since to prevent injury to the active principle the gland is not heated to over 30 or 35 degrees C., in the preparation of the tablets. To

obviate these defects preparations of the thyroiodin itself in the form of a milk sugar triturate are now produced, and have been quite widely used in Germany. This permits accuracy in the dosage and does not require the administration of doubtful extraneous materials along with the drug, while all the effects of the other preparations seem to be obtained.

The ordinary dose is from one to three tablets, each representing five grains of the gland. A few large doses seem to have no bad effect, a case having been reported where a child two and one-half years old took at one time ninety tablets without any noticeable effects. Buschan took, in a short time, 250 tablets, up to twenty a day, and noticed only slight symptoms of the heart and diuresis. If the large doses are continued, however, there will appear serious symptoms, the most marked of which are palpitation of the heart and headache, nor do they seem to have more effect upon the diseased conditions than do the ordinary doses, which do not generally produce subjective symptoms. During the administration considerable diuresis and a loss of weight without impairment of strength and vigor are generally noticed. The thyroiodin is apparently absorbed as such, and produces its effects very quickly, indications of its action being often observed in a few hours. What its ultimate destination and fate may be are unknown. The statement of Roos, that the thyroiodin acts more rapidly when administered in the free state than do the extracts, is not borne out by clinical experience.

The conditions in which the thyroid therapy has met its greatest successes are naturally the two athyreotic diseases, myxedema and cretinism. At first the thyroid extract was exhibited only in these two affections, but as more was learned of its effects its use was extended until now there is hardly a diseased condition in which it has not been tried and, as with every new remedy, it has at least a few advocates for its use in each of them. Only those diseases, however, in which there is some logical reason for its use or in which it has met with a certain degree of success, will be considered, and they will be taken up approximately in the order of their value of this method of treatment.

Myxedema.—The relation of this disease to the thyroid gland was first pointed out by Ord in 1878, and its identity with the condition resulting from operative removal of the thyroid was shown by Reverdin in 1883. The experimental production of the same symptoms in animals and their prevention by transplantation of glands into other parts of the body by Schiff and Horsley led to the suggestion by the latter, in 1890, that sheep's thyroids be transplanted into people with this disease, and was the beginning of thyroid therapy. As myxedema is due simply to a lack of thyroid secretion, because of an atrophy of the gland, varying from a marked reduction in size to a complete replacement of the secreting structures by fibrous tissue, the administration of thyroid extract produces an absolutely certain cure. If the disease is correctly diagnosed and an active preparation of the gland used, there can be but this one result. Since, however, the gland can not be restored to its normal condition the cure lasts only as long as the remedy is being administered. Therefore the treatment is in two stages: In the first the dose is large—up to ten or fifteen grains per day, until the patient reaches a normal condition; the second consists in the administration of smaller doses at regular intervals to prevent the return of the symptoms, the amount necessary varying with different cases, but this can be determined in a short time by the reduction of the dose until the minimum amount is ascertained, generally one or two five-grain tablets a week being sufficient. If in the first stage of the treatment the dose is pushed too high, it will be shown by the appearance of palpitation of the heart, headache, itching of the skin, and sometimes even delirium and spasms are produced. All these symptoms can be obviated by diminishing the dose.

Under this treatment the swelling of the skin disappears, and it becomes moist, soft and flexible. The pulse rate increases, there is a return of vigor, and the patient loses the mental torpor and apathy. All these changes occur to completion in a few weeks, and improvement is often noticed in twenty-four hours. Occasionally glycosuria and albuminuria have been noticed during the treatment, but these cases are not common and the condition is usually transitory. Serious effects are sometimes produced in cases where heart lesions already existed, two or three patients having died while under the treatment, and in such cases great care must be taken to avoid overdosing.

Cretinism.—This disease is fortunately very rare in the United States. Osler, in 1893, was able to collect but eleven well authenticated cases occurring in this country, but since that time, on account of the general interest in this disease because of its connection with and cure by the thyroid gland, many more have been reported. One occurring in Chicago was reported a year ago by Dr. J. B. Herrick, and Dr. D. L. Shaw has now a case in his practice. Since cretinism is a congenital athyreosis, the cure by the thyroid extract is just as certain as in myxedema, while the changes are even more marked. A dwarfed, misshapen, repulsive creature, devoid of intellect, and but a source of disgust and care to those about him, is transformed in a few weeks or months, at the most, to a child with at least ordinary sightliness, which runs about and plays with as much vivacity and vigor as any of its mates—one of the lowest forms of animal existence has been changed to a human being. This power of the drug alone entitles it to a place among the specifics. However, it is not probable that the cure in these cases will often be complete, since, as a usual thing, before the trouble is recognized changes have taken place in the skeletal and cerebral structures that can not be fully repaired; but nevertheless the treatment is of inestimable value and it may be that some means of early diagnosis may make possible perfect results. As in myxedema the treatment must be continued throughout the life of the individual. Fortunately there is no such thing as an acquired tolerance of the drug, Murray's original patient being now living in good health, but still taking the thyroid.

Simple Goiter.—The writer has collected, from the literature, 584 cases of simple goiter treated with the thyroid extract, and of these, 475 or about 82 per cent. have been improved. Bruns, who has treated about 350 cases in this manner, sums up the results as follows:

1. The greater proportion of goiters are amenable to treatment with the thyroid, both the swelling and accompanying troubles being relieved. Only about one-fourth remain uninfluenced.

2. A complete cure of goiter only occurs in about 8 per cent. of the cases; in one third there is a considerable decrease in the swelling with complete

obviation of the symptoms; and in another third there is only a moderate diminution.

3. Age has great influence, the beneficial results being greatest in children and diminishing with age. The less time the goiter has existed the sooner its cure is resulted.

4. Immediately on administration the results begin to appear, and after four to six days the size of the neck is measurably diminished, and the breathing freer. In 300 cases the diminution was reached in two weeks in 60 per cent.; in 40 per cent. after three or four weeks.

5. Of the different forms of goiter only one, the simple hyperplastic struma, is accessible to this treatment, but here the action is certain and prompt.

6. In more than three fourths of the cases, after stopping the treatment the goiter again grows, generally beginning in from one to four months after the cessation. However, small doses at stated intervals are sufficient to prevent the recurrence.

The improvement in simple hyperplastic goiters is explained readily enough if we consider that the hypertrophy is simply an attempt on the part of the gland to meet an increased demand from the system for thyroiodin. This increased demand may be considered as due, either to some change in the metabolism of the body requiring an unusual amount of thyroiodin, or to a deficiency in the supply of iodin brought to the body by the food and drink, which requires unusual activity on the part of the gland to accumulate enough iodin from the blood to produce thyroiodin for the requirements of the organism. Whichever is the case the object is apparently attained, for in ordinary goiter there are no symptoms due to lack of gland secretion. If the first of these suppositions is correct we would expect that the gland would contain an increased amount of iodin, although the amount in each gram would not necessarily be increased over the normal. In the second case we would expect to find the total amount for the enlarged gland very much the same as in a normal gland, and therefore the amount in each gram would be much below the normal.

Baumann found, in a series of twelve cases of goiter in which the average dry weight was 32 grams, that the total amount of iodin in each gram was but 0.09 mg., which gave as a total 2.6 mg. of iodin to each gland, or practically the same as he had found to be the usual amount in Freiburg glands. These results, therefore, point to the second of these hypotheses as being more probably correct. The writer has analyzed a smaller number of glands, which, however, have led to different conclusions, namely: That goiters due to a simple increase in the gland tissue, so that they consist structurally of masses and strings of cells or epithelial lined vesicles, which may or may not contain colloid (struma hyperplastica parenchymatosa), do agree with the second hypothesis; but that colloid goiters in which the increase in size is due to a production of colloid-filled spaces with little inter-vesicular tissue, agrees with the first hypothesis. These conclusions are based on the analysis of five goitrous glands.

Two were of the hyperplastic variety, consisting structurally of masses of tubules closely packed together, with few colloid-containing vesicles, and many masses of epithelial cells with no definite arrangement, together with a considerable increase in the connective tissue. Of these:

No. 1 was from a woman of German birth, 69 years of age, a resident of this country for twenty years. The dried gland weighed 27.07 grams, each gram containing 0.304 mg. of iodin, which gives as a total 8.23 mg. of iodin. No. 2 was from a man, 40 years old, of Irish birth, but probably a resident of this country for many years. The dry gland weighed 16.24 grams, contained 0.511 mg. of iodin in each gram, with a total amount of 8.3 mg. in the entire gland. Both of these results are close to the average amount found in normal glands in this country, while the amount in each gram is in one case but one-fourth, in the other but one-sixth the normal proportion.

Two others were diffuse colloid goiters, consisting throughout their entire substance of greatly dilated vesicles lined with flattened epithelium and distended with colloid. No. 1, from a woman, recently come to this country from Bohemia. The gland weighed 13.19 grams, each gram contained 4.03 mg. of iodin, the total amount being 53.16 mg. No. 2, from a woman of English birth, 30 years of age, whose dried gland weighed 12.42 grams, each gram containing 1.98 mg., the total content being 24.59 mg. of iodin. These glands would seem to indicate, therefore, that the proportion of iodin in colloid goiters is at least as high as normal with the result that the total amount is very large. This is especially well shown by the fifth gland, which was also from a Bohemian woman, and which contained a nodule that was composed of tissue nearly identical with the colloid goiters in structure, but which seemed to be a benign neoplasm. This nodule was surrounded by a distinct fibrous capsule, so that it could be removed without disturbing the rest of the gland, and it was then analyzed separately. The nodule was found to contain in each gram 1.98 mg. of iodin, while the remainder of the gland contained but 0.8 mg. in each gram. The total amount in the entire gland was 9.26 mg., or about the normal quantity. Therefore it would seem that the colloid new growth had so met the demands of the body, that the remainder of the gland had lessened its activity in proportion.

The writer would also call attention to the fact that Baumann found two goiters containing large amounts of iodin in his series; in one there was 17.5 mg., in the other 31.5 mg., which are especially large quantities when compared with the low normal content of the German glands. It seems very probable these were colloid goiters. Since the number of goiters available to the writer was so small, the statements based on the results of these investigations are not made as positive, further than that they agree with the facts at hand. The possibilty that more statistics may show these cases to have been exceptional is fully appreciated.

An interesting suggestion coming from the analyses of the goitrous glands is, that not only does the normal American gland contain a much greater amount of iodin than does the German gland, but also that this amount is necessary to inhabitants of this country, so that the gland will hypertrophy to keep the iodin content up to the standard, as shown in the first two goiters.

(To be continued.)

Inconveniences of Airol in the Treatment of Soft Chancre.—O. Goldfarb reports several patients treated with airol for soft chancres, on whom it produced blisters, etc., resembling a burn of the second degree.—*Semaine Méd.*, August 11.

SURGERY ONE HUNDRED YEARS AGO.

AN HISTORICAL STUDY

BY DR. GEORGE FISCHER.

DEDICATED TO THE GERMAN SURGICAL ASSOCIATION.

TRANSLATED FOR THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION BY CARL H. VON KLEIN, A.M., M.D.

XV.—DISEASES OF THE BONES, JOINTS AND MUSCLES.

(*Continued from page 911.*)

As to the diseases of the muscles, we emphasize that after W. Cooper (in 1694) first described a *muscular luxation* of the long head of the biceps, Bromfield and Pouteau likewise mentioned it, but the symptoms collected do not make the diagnosis sufficiently certain. It is evident that hitherto no verifying post-mortems for isolated dislocation of the biceps tendon, not combined with luxation of the ball of the joint, are at hand. One saw *muscular lacations* of the biceps completely healed (Duchenim, 1786). J. L. Petit has noticed a case of *rupture of the tendon of Achilles* of a juggler, who in an attempt to jump upon a high table with both feet at once sustained this injury of both tendons. For the treatment, wherein the principal point lies in extending the foot and bending the knee, he and Ravaton constructed so-called slippers. Perhaps the circumstance that two so illustrious men as J. Hunter and Alexander Monro, senior, each suffered a laceration of this tendon contributed to the fact that the injury hitherto little known became a veritable mine of inventions of new bandages. (Our time experienced something similar when Garibaldi's injury to his foot drew after it every possible and impossible invention.) Hunter condemned the exaggerated carefulness of treatment, but fell into the opposite error when after a few days he arose and went about with a shoe which had a high heel; in his case the intersubstance is said to have become ossified. As regards bandages, we notice that Monro left the point of the slipper open in order not to hurt the toes. Just on this account and because after healing, walking in the slippers was difficult for the patient, Desault invented a new bandage; he placed at the back of the limb a long compress reaching from the foot to above the knee-joint, filled out the hollows at the sides of the tendon with graduated compresses and made a circular envelopment from the joint of the foot to the knee. Wardenburg modified this bandage and had hollow splints of metal adjusted to the knee and ankle-joints. Richter recommended his pupil's method, when one could not by the position of the limb alone, always the best treatment, bring about a contact of the ends of the tendon. Very simple, too, was Schneider's bandage, which bound the leg, with the foot extended as much as possible, to a hollow splint reaching from the toes to the knee (1787). The suture of the tendon recommended by Heister, Garengest and others was soon discarded on account of inflammation and suppuration of the tendon and of the tearing out of the suture (Richter). Acrel reported a cure by this method, but after a few years the tendon tore apart again in the same place by a quick upward step.

Caput obstipum was supposed to arise from scars, the contraction of the sterno-cleido-mastoid muscle in consequence of a metastasis of an irritating morbid matter to the clavical muscles or from paralysis of them, or muscular cramp. It is well known that today a few surgeons deny the so-called congenital form, which is said to arise only from the laceration of the sterno-cleido-mastoid at birth. On the other hand, it is to be remembered that Bündell, in the year 1762 (R. A. Vogels "Neue med. Bibl.," V. Bd., S. 189), demonstrated as the cause, at that time still unknown, of congenital caput obstipum, "that the M. mastoideus upon one side was only a tendon," and Hensinger (1839) found the contracted sternal portion of a child a few days old, was composed not of muscle substance but of white tendinous tissue. Only the wry-neck from muscular contraction demands an operation, when the internal and external application of anti-dyscrasia remedies are without avail (Richter). Shard deserves the credit for the method of operation; he had the sterno-cleido-mastoid strained, cut across the skin, inserted under the muscle a probing knife devised by himself and severed the muscle from within outward. His treatment was the most used until the time of the subcutaneous methed. B. Bell, for fear of injuring the vessels and nerves, advised separating the muscle gradually by small incisions from without inward. As a rule the separation of the sternal portion satisfied Richter, who considered an inch above the sternum as the best place for the incision, but he also cut through the clavicular portion if it was strained, and afterward held the head straight by means of bandages until the wound was healed. For that purpose a leather cap, devised by Köhler of Jena, was very much used (1796). It has been previously mentioned that Gooch first observed a wry-neck caused by the contraction of the platysma myoides, which he cured by cutting the entire breadth of this muscle underneath the skin (1759).

Orthopedia as a science was born in the eighteenth century and was first cultivated upon Swiss and German soil. They who claim a French origin for it because Andry, the originator of the word orthopedia, published the work "L'orthopédie ou l'art de prevénir et de corriger dans les enfants les deformités du corps" (Paris, 1741), should reflect that in this work many other diseases, as chilblains, harelip, red nose and itch, are treated. Crooked limbs were regarded by the great mass of surgeons as incurable; the patients were left to the physicians of the Jahrmarkt and so-called "regulators" (Einrichter). *Johann Andreas Venel* (1740–1791) of Yverdun came forward to dedicate himself entirely to this neglected branch of surgery. The successful cure of a clubfoot induced him in his 39th year to go to Montpellier for the second time, in order to study anatomy again. He then had a hospital of his own built, where in special work-rooms in connection with it, apparatus and bandages were prepared under his supervision. Soon the number of his patients grew, and they came to him from Switzerland, Germany and other countries; but he accepted only children who had not passed their eighth year, and treated their curvatures of the feet and knees, and probably also of the spine. At their entrance, and again after they were fully cured, he made in each case a plaster cast of the deformed limb and published drawings upon eight plates. Within twelve years of tireless activity, during which he had to contend against poverty, misfortune and many difficulties, he accomplished about a hundred successful cures; his method was about to be made public when he died. Dr. Ehrmann of Frankfort on the Main was the first who imitated Venel's treatment in Germany, and he imparted it to Brückner of Gotha, who then likewise took up this

specialty and published a work on it ("Ueber die Natur, Ursachen und Behandlung der einwärts gekrümmten Füsse oder der sog. Klumpfüsse," Gotha, 1796). The works following, by the two Germans Naumburg and Wanzel, were unimportant, while abroad, Sheldrake (1794) and especially Scarpa ("Mem. chir. sui piedi torti congeniti dei fanciulli," Pavia, 1803) deserved some credit for their work on clubfeet. Portal's work ("Obs. sur la nature et la traitement der Rachitisme, ou des courbures de la colonne vertébrale et de celles des extrémités," Paris, 1797), and in Germany Feiler's work ("De spinæ dorsi curvationibus," Altdorf, 1798), were of importance for curvatures of the spine. Orthopedics was wrested from the quacks and elevated to an independent surgical doctrine.

It was known that clubfoot was as a rule congenital, and the cause was supposed to be an unnatural position of the foot in the uterus, it being pressed inward, which resulted in a contraction of the m. tibialis ant. and post. and of the gastrocnemius. It is well known that Eschricht (1851) first taught that that position of the fetus was not unnatural and that congenital clubfoot could be explained as the persistence of the normal curvature of the fetus at a certain stage. To correct the contraction was the object of the treatment, which offered a better prospect of success the earlier after birth it was undertaken. In order to relax and distend the muscles, the German surgeons, according to the example of Brückner, first had emollient remedies rubbed in, gave foot-baths and continually kneaded and stretched the foot with the hand according to prescribed manipulations, but never allowed the patient to walk on his feet. Only when after a few weeks a greater flexibility was reported, were bandages or apparatus applied and that treatment continued. Among the great mass of newly invented appliances those of Cheselden, White, Van der Haar, Bell, Brünninghausen and others, were the best known. Venel's sabot and Brückner's boot were the two principal types of apparatus for clubfoot and were older than Scarpa's boot, which has become celebrated. For newborn children they were usually satisfied with Brückner's bandage. When walking was again permitted they had the patient wear a laced boot which reached to the middle of the lower part of the thigh and had no heel, but a heel-cap of stiff leather. The most important advancement was due to the German physician Thilenius, who in 1784, in the case of a clubfoot of a girl 17 years old, which neither bandages nor apparatus helped, in spite of the traditions of antiquity as to the danger of tendinal wounds, showed the great courage to have, for the first time, the tendon of Achilles severed, after it had been laid bare and made free by an extensive cut. He was not understood by his contemporaries. Even in the year 1792, C. C. von Siebold regarded the straightening of a clubfoot by severing the ligaments and tendons as dangerous to life on account of gangrene and caries; and he recalled with horror how a country surgeon had the knife in his hand, ready to straighten the foot of a newborn baby!

XVI.—DISEASES OF THE BLOOD VESSELS, NERVES AND SKIN. NEOPLASMS.

Aneurysms; Phlebitis, wounds of the veins; Lymphangitis; Anesthetics; Tetanus, compression of the carotid, facial pains; Ulcers; Furuncle, carbuncles, erysipelas; Burns, chilblains, whitlow; Warts, corns; Neoplasms, scirrhus and cancers; Breast, lip and chimney-sweep's cancer; Encysted tumors; Ganglion, teleangiectasis.

If, in Germany, nature was sparing of *aneurysms*, yet art replaced this lack with sufficiency by the lancet of the barbers and of the barber journeymen. Within five months four cases of aneurysm from blood-letting came under the treatment of Professor Leber of Vienna. There existed at that time great confusion in nomenclature, as is the case even yet to some extent; they threw true and false aneurysms together promiscuously. While a few called the aneurysm arising from a blood-letting a true aneurysm (Leber and Plenk), others applied this designation only when the sac consisted of strong annular muscle fibers (A. Monro); again, others called the cylindric form, caused by the distension of the entire arterial wall, a true aneurysm, and, on the other hand, called the sac formation, which arises from the laceration of the inner membrane and the distension of the outer, a false aneurysm (Morgagni). In Germany those classifications were the most current which came from England, the country in which aneurysms were most frequent, where the two Hunters, D. Monro and J. Bell devoted themselves especially to this disease. In the second half of the century, they designated those swellings in which the artery was at any place unnaturally enlarged or distended as aneur. verum, and distinguished them as aneur. verum circumspectum and diffusum, according as the distension was found in only a small place or to a greater length of the artery. On the other hand, the swelling in which the blood entered the cellular tissue through an unnatural opening of the artery, and, as Heister would say, flowed between the skin and the flesh and formed a sac there, was named aneur. spurium. Donald Monro applied this name especially to the traumatic hematoma of the present day. The false aneurysm was also either circumspect or diffuse, and was most excellently described by John Bell. As a third main division, Hunter introduced the aneur. mixtum, in which the external coat of the artery was lacerated by an injury and the internal uninjured coat was in consequence distended as a sac through the opening (an. mixt. int.), or *vice versa;* after laceration of the inner coat, the outer is enlarged (an. mixt. ext.). The first form was later declared to be impossible, as J. Hunter's experiments had demonstrated that the inner coat does not bulge out after the removal of the outer. He had removed the outer and a part of the other coats of the carotid and crural in dogs, so that through the thin walls one could clearly see the blood as it flowed; but the artery was never distended. An an. mixtum was also supposed to arise from the bursting of a true aneurysm. W. Hunter discovered (1762) the communication between arteries and veins resulting from blood-letting; in this way the anterior wall of the vein is closed while the posterior wall and the wound in the artery remain open, so that the arterial blood presses into the vein and distends it. He named this varix aneurysmaticus. Park described an aneurysm from blood-letting, as large as the fist, in the bottom of which he found, after opening the sac, an orifice into which he inserted a probe to the depth of an inch but could move it neither upward nor further downward. The orifice led into a small sac, the size of a nutmeg; lying underneath, and at the bottom of this sac, was an aperture through which one could penetrate into the artery. After that these swellings were separated into kinds, the aneur. varicosum and the varix aneurysmaticus. The confusion became greater when W. Hunter, to some extent, confounded the s

called an. cirsoideum with those two forms, and a few surgeons began to designate them as an. per anastomosin. J. Bell gave this name only to those blood tumors, which, distinct from congenital teleangiectasis, in consequence of an injury, arise from the enlargement of previously existing anastomosis of smaller arteries and veins. Finally, in the beginning of the century, Scarpa threw them all aside and declared that there is no true aneurysm in the old sense, since none ever arises from an equal extension of all the arterial coats, but from the destruction of the inner and middle coats and the escape of arterial blood into the cellular sheath or tissue enveloping the artery. A weakness of the arterial wall, as a result of bruising, sudden wrenching, or forcible movements, or most frequently a disease of the arterial system, were regarded as the causes of true aneurysms. A. Monro, senior, knew the bony and stony concretions of the inner coat very well, and considered them a frequent cause of arterial disease. Donald Monro also often found all the arteries extraordinarily fragile and brittle; sometimes, on the other hand, unnaturally hard, almost bony (1771), and Baillie observed frequent ossifications with increasing years (1793); but no one saw clearly the atheromatic process as the cause of aneurysms. They believed, indeed, in a general cause, because sometimes several swellings appeared at the same time on various parts of the body; for example, Donald Monro saw on one patient four aneurysms on the right arteria cruralis and two on the left. Our forefathers described the symptoms very accurately. Donald Monro advised against feeling of the swelling too often and too vigorously in examination, because in so doing one might easily loosen a bit of coagulated blood, which, being carried away, might occasion an obstruction in one of the other arteries, whereupon unexpected conditions might ensue. What Monro wished to avoid, Ferguson in our day recommends in treatment; but his kneading method has had no success on account of its danger. Ford and Desault described spontaneous healing. The latter had decided to operate in a case of true aneurysm of the popliteal when he suddenly noticed that the swelling had diminished about two-thirds in twenty-four hours, no longer pulsated, and had become quite hard, while above the swelling the cruralis with the side branches pulsated much more strongly. When the patient died of apoplexy they found the arteria poplitea, close above the aneurysm for a length of three inches and also below it as far as the division in the tibialis, was entirely obstructed by a clot of blood. According to Heister, false aneurysms gave a worse prognosis than the true, and he regarded aneurysms of the carotid, subclavian, axillary and of the crural near the trunk as incurable, because in an operation for them one could not stop the blood and had to fear inflammation.

In the first half of the century the treatment was mainly directed to the size of the swelling. Besides Valsalva's method, which was supplemented with local applications of ice (first mentioned by Donald Monro), they recommended compression for the small swellings and incisions for the large ones. The compression was at that time direct. Heister constructed a truss-like instrument, whose pelotte was pressed against the swelling by means of a screw. This was supplanted by the compressorium of the Berlin physician, Senff, which consisted of a cushion of a doubly decussated feathers and found many applications (Platner, Richter and Acrel). The number of compressoria and compression bandages grew to infinity, but they added nothing to the favorable results. Then there appeared as the next advancement the indirect compression, which, as a rule, was applied together with direct compression, but was not yet applied by itself. It came from the German surgeons.

History unjustly ascribes the priority in the introduction of indirect compression to Guattani (1772), but in the year 1770 Leber made public some cures by compression in connection with indirect. He laid a hollowed cork on the swelling and pressed together the upper part of the artery by graduated compresses. Theden, moreover, made public his methodic envelopment of the whole limb, with long narrow compresses the thickness of a finger, on the trunk of the artery (1771), and in this way he cured traumatic aneurysms. These German observations were known, therefore, two years before Guattani's work appeared. To him direct compression on the swelling was the main point, and he used the indirect in the form of long narrow compresses and bandages only as a means to weaken the pressure of blood at the swelling. Leber also deserves the priority in attempting indirect compression alone, without direct, although his treatment failed in the case of an aneurysm from blood-letting, and he did not properly estimate the value of this method. The honor should remain with Desault of having first attempted indirect compression alone in a case of "true" aneurysm (1785), when, according to Camper's clever idea, he compressed the subclavian against the clavicle, in a case of aneur. of the axillaris; the patient would not submit to a continuance of the treatment. J. Hunter first accomplished a cure (as E. Home related in 1793) by means of indirect compression in the case of an aneurysm of the cruralis in the middle of the leg, by the application of a tourniquet to the artery a little below the lig. Poupartii. The pressure became so painful that the instrument had to be taken away, but after threatened inflammation and swelling of the aneurysm the pulsations ceased and the sac became quite small and hard. Hunter, indeed, seemed to have some curiosity to further prove indirect compression, but as in the next case also the pressure caused by the tourniquet could not be borne, he discarded the method. Then Brückner of Gotha accomplished a cure (1797) with indirect compression, in a very large true aneurysm of the popliteal, in the belief that this treatment was the principal remedy. He used an annular tourniquet; laid on the other side of the limb a long, stiff splint, and carried the compression of the art. femoralis only so far that the pulsations in the sac became weaker but did not entirely cease. (My historic notice in the Deutschen Klinik, 1868, Nr. 13.)

The methods of operating for true aneurysms consisted almost universally in the splitting of the sac with a double ligature (Antyllus) or in extirpation after the trunk of the artery had been fastened above and below the swelling. These old operations were for the most part fatal, insomuch that many surgeons abandoned them and amputated the limb (J. L. Petit), a passage out of the rain into the gutter. The idea of using the ligature for its own sake, without opening the sac, was an extraordinary advancement. It arose in Paré's time; for his pupil, Guillemeau, wrote as early as 1649, "Si en quelques autres parties extérieures il se présente au chirurgien pareil aneurysme, il peut seurement découvrir le corps de l'artère vers sa racine et partie supérieure, et la lier de mesme

façon sans autre cérémonie." Anel made the earliest known operation of this kind on Jan. 30, 1710, in an aneurysm of the elbow curve, in which he bound the art. brachialis tightly above the sac. What were his thanks? His colleagues attacked him bitterly, and ascribed the cure to accident. Seventy years passed before Anel's idea came to the front. In the year 1781 Assalini saw this operation performed by the physician and surgeon of the Duke of Modena, Hercules van Este Spezzani. Desault convinced himself, by injections and experiments upon animals, that a ligature of the femoralis does not disturb the circulation in the lower parts of the limb, and in June, 1785, in an aneurysm of the popliteal he bound the femoralis close under the fork of the abductor magnus with success. But John Hunter first taught the true value of this operation. He also had formerly applied ligatures above and below the sac, and observed that death always resulted through hemorrhage or suppuration. Indeed, in September, 1785, he declared a thigh aneurysm of the size of an orange as not amenable to operation. Nevertheless, on December 12, he accomplished, whether with or without the knowledge of Desault's success, can not now be readily decided, his first celebrated ligature, which, instead of being applied close above the aneurysm, according to Anel's method, was placed at a greater distance from the sac. In view of the fact that the artery in the neighborhood of the sac was diseased, so that the threads of the ligature might easily cut through it at this point and cause a fresh hemorrhage, he bound the artery higher up, where it was presumably healthy, and the cutting through of the thread therefore not so much to be feared. It appeared to him sufficient to merely retard the flow of arterial blood by means of the ligature and by a gradual narrowing of the passage of the artery to moderate the flow of the blood toward the point of ligature whereby the blood in the sac coagulated and the sac shriveled up. Therefore he considered it unnecessary to open or to extirpate it. Hunter operated on a large aneurysm of the poplitea in the following manner: He made an incision into the front and inner side of the upper thigh somewhat above the middle, obliquely over the inner wall of the sartorious, laid bare the artery, isolated it with the spatula, introduced four threads under it, and so bound it in four places separated a little way from each other. Of these so-called reserve ligatures he bound up the thread farthest from the heart entirely tight; the one nearest to the heart remained lying under the artery as loose threads; the two other threads, as loose nooses, gradually narrowed the arterial passage. In case suppuration cut through the actual ligature too soon the loose threads should serve to quickly close the bleeding vessel again. The patient survived an after hemorrhage, and was cured only after seven months. This fortunate result convinced him that it was by no means entirely necessary to exclude arterial blood from the sac insomuch that he asked himself if the ligature was on the whole necessary, and if indirect compression would not suffice to keep the blood out of the sac until that remaining within it had been coagulated. He therefore undertook the above mentioned experiments in compression. He very quickly gave up the idea that it was better to bind the artery loosely in several places than strongly at a single point, and in his later operations always applied but one ligature, and drew it tightly together. He first recognized also the great importance of the coagulum in the sac which had hitherto been always regarded as an obstacle to healing and also the significance of collateral circulation. Hunter first established the principles of continuous ligature and introduced into practice his method of operation, which then, as today, bore his name, whereby, as Scarpa said, he erected an eternal monument to his renown.

In order to establish the method it was necesssary to demonstrate that the ligature of the trunk does not destroy the nourishment of the limb. Heister was very uncertain as to this point, and wished to have the question cleared up by dissections. Before the operation, compression of the main trunk was always recommended in order to drive the blood more into the collaterals to enlarge them, so that after the operation they could at once maintain the circulation in the limb (W. Hunter). This enlargement of the collaterals, by which sufficient blood was conveyed to the underlying parts, removed every danger from the stricture of the main trunk. They began to paint the great dangers of the old method of stricture according to Antyllus with vivid colors (Guattani and Deschamps), and Hunter's operation was soon copied by Blizard, Lyon, Birch and Cline. E. Home extolled it as very simple and safe, insomuch that it won the precedence over all other methods. At first Pott's authority stood somewhat in the way, unfortunately. Pott and also J. Hunter had observed that the artery almost always became diseased for a considerable distance above the sac, hence a ligature at that point is ineffective; he had also always observed a fatal result in operations according to Antyllus, and he regarded amputation as the only possibility of saving life, which Bromfield, on the contrary, opposed entirely. In the year 1786 Pott, in an aneurysm of the poplitea, made still another attempt to bind the artery on the posterior side of the thigh, and to the question as to what he would have done if he had found the artery diseased, he answered that in that case Hunter's method might perhaps be followed. But he could not easily decide to adopt this method because the oblique incision would sever most of the lymph vessels on the inner side of the thigh. Once he applied the ligature a very little distance above the sac, but the artery did not appear to be constricted at all, and he amputated the limb. Richter was cautious in his judgment of Hunter's operation. He did not comprehend the excellence of it; he could only condemn the four loosely applied ligatures as questionable, since Guattani had cured large aneurysms by direct pressure. In France, Hunter's reserve ligatures found favorable acceptance; Boyer and also Lisfranc applied four, sometimes even twice as many "ligatures d'attente." But Abernethy condemned this practice, since, in the multiplication of ligatures, one must separate the artery from its natural surrounding for too great a distance.

There remained certain large aneurysms (iliaca ext. and axillaris) in which a ligature above the sac, in short, every means of saving the patient, seemed impossible. Then Brasdor originated the ingenious idea of binding the artery just underneath the sac, leaving the latter itself, that the stagnating blood might coagulate and be absorbed, and the sac be obliterated. This operation, approved by Desault, Deschamps first performed (1798) in an aneurysm of the femoralis in the groin, but with fatal results. We can disregard the various other suggestions of that time for the

cure of aneurysms, for example Lambert's arterial suture.

The discovery of *phlebitis* by John Hunter (1793) was the most important advancement in the realm of venous diseases. Could a vein become inflamed? The Germans theorized over this question *pro* and *contra*. Hitherto the doctrine, which even Z. Platner advanced, that venous inflammation could not occur, was accepted. His son first admitted (1793) that "the obstructions and inflammations, which it is believed are found in the arteries, as a rule, apparently have their seat in the veins. But he doubted whether in venous inflammation the blood exuded into the cellular tissue; when this is not observed, and, much more, when only the gorged blood vessels protrude, inflammation of the veins and not of the arteries is present." All empty froth; not a word of observations and dissection reports! Hunter taught that the inner coat might be the seat of inflammation and suppuration, especially in the larger veins, when, in case of severe inflammation of the cellular tissue, they run through the inflamed part, whether the inflammation arises spontaneously or after an injury. He could sometimes show actual accumulation of pus in the vein, and, after blood-letting, many small abscesses in the entire course of the vessel; in dissections the vein was frequently stuck together in several places and ulcerated. The result of large collections of pus is the obstruction of the vein. He believed that phlebitis was especially to be feared if the inner cavity of the vessel is exposed to the outer air, and he therefore advised, in bleeding, that the wound in the coat be well drawn together and covered with a compress. He distinguished an adhesive, suppurative and ulcerative phlebitis. The first form was said to proceed from the extravasation of coagulable lymph; in the second, pus arises in the inside of the blood vessel, which is mingled with coagulated components of the blood; in the last, abscesses are formed whose evacuation by the action of the heart is often prevented by adhesive inflammation. Large venous wounds were treated by pressure, or, if this was not sufficient, by stricture; this latter method was not avoided since the anastamosis maintained the circulation.

J. Hunter also described the symptoms of *lymphangitis* with the streaks running upward, the painful glandular swellings, chills, etc., and traced the phenomena to an irritation spreading along the lymph vessels. Theden groped in darkness, when, in his own case, after an injury, a "panaritium followed by boils on the inner condyle of the upper arm" developed, from which the pain became so great that he had almost determined upon amputation. He said that the disease was indeed very similar to a panaritium, "but was still something of another kind, and proceeded from an absorption of putrid matter." There was even some question as to lymphangitis with suppuration of the lymphatic glands.

As regards the *nerves*, we have already mentioned the experiments of the Göttingen surgeons, Arnemann and Michaelis, in regeneration of the nerves, and also the discovery of the motor and sensory nerves by Charles Bell. What the English surgeon first proved absolutely by striking physiologic experiments, the Frenchman, Pouteau, had previously anticipated (1783), in that, from the fact that with patients sometimes a part of the sensation is entirely lost while the power of movement is not affected, he concluded that there must be different nerves for the two functions. He thought that the sensory nerves proceed from the cerebrum, the motor nerves from the cerebellum.

For centuries opium has been given in order *to make surgical operations as painless as possible*. But it is not of much use if it is not given in very large doses; then it is injurious. An early propagation of anesthesia we find in a wonderful way in Spain, where the physician, Theodorico, afterward Bishop of Cervi, had already described it accurately (1498). The Spaniard, Don Juan Fragoso, gave the following directions (1581): Take the juice of henbane, cicuta, mandragora and poppy, saturate a new sponge with the mixture, let it dry in the sun, then soften it again with hot water and have the patient inhale the vapor until he falls asleep. To waken him, he must be made to inhale warm vinegar vapor. Hans von Gersdorf had already given similar directions (1540). To avoid the injury of opium, James Moore of London suggested (1784) that the main nerves be compressed by means of a tourniquet, which must continue half an hour, until complete insensibility ensues. His observations were not sufficiently convincing; the continued and unavoidable pressure upon the blood vessels was also feared, therefore his suggestion did not prevail.

(To be continued.)

PRACTICAL NOTES.

Turpentine in Scarlet Fever.—The announcement of the specific action of turpentine in mumps (p. 595 JOURNAL), is now supplemented by a communication from Pujador y Fauva stating that he has cured 120 cases of scarlet fever with turpentine, children and adults, who were out of doors before three weeks, and none showed traces of albumin in the urine. Several malignant cases, ataxic, were cured by two hypodermic injections of 1 gram of essence of turpentine.—*Gaz. Méd. de Liége*, September 2.

Improved Local Treatment of Tuberculous Laryngitis.—According to M. R. Botey, the following formula combines in one remedy the advantages of cauterizing with lactic acid and painting with phenicated glycerin. The laryngeal mucosa is first rendered anesthetic with a 10 per cent. solution of cocain and then touched with the mixture, commencing with a small amount of phenic and lactic acid in the glycerin, and gradually increasing until the following limit is reached: Phenic acid, 1 to 5 grams; lactic acid, 2 to 15 grams; neutral glycerin, 20 grams. For external use.—*Semaine Méd.*, August 11.

Treatment for Whooping Cough.—Leuriaux, who has made whooping cough a special study, has addressed a paper on the subject to the Paris Academy of Medicine. The result of his researches shows that the treatment should be purely local and antiseptic. He recommends nasopharyngeal insufflations of a powder composed of sulphate of quinin (4 parts), resorcin (1 part), and white powdered sugar (25 parts). Insufflations should be taken five or six times a day, preferably after a fit of coughing. The Academy referred the paper to a committee to study the question.

By Combining Eucain with Cocain we secure a valuable anesthetic with the advantages of both and none of the inconveniences of either, according to the *Journ. de Méd. de Paris* of September 12. Eucain is the methyl ether of methyl-benzo-tetramethyl-γ-oxypiperidin-carbonic acid, and is a white crystal substance soluble in water, alcohol, ether, chloroform and benzine; melts at 104 degrees C; is not decomposed by boiling like cocain. Its solutions are consequently not affected by sterilization. Its anesthetic action is more durable than

that of cocain, while it is not toxic. Its effect on the pulse is to retard it while cocain accelerates it. A good formula for the combination is: Hydrochlorate of eucain, hydrochlorate of cocain, aa 20 centigrams; boiled distilled water, 20 grams. For hypodermic injection 1 c.c.

Success of Dittel's Elastic Ligature for Hemorrhoidal Nodules.—Recovery followed in every one of the 269 cases that have been treated in Dittel's service; twelve days the average. No anesthesia is used except Schleich's local infiltration. The curved polypus forceps are guided by a finger of the left hand inserted into the rectum. By turning the forceps ninety degrees the nodule is brought up out of the anus and with the surrounding mucosa is then ligated with an elastic cord stretched to its utmost. The nodules lose their vitality in eight to ten days and drop off, leaving a clean granulating surface. The external anal skin must not be included in the ligature, as this is very painful.—*Memorabilien*, August 23.

To Arrest Inflammatiou Subsequent to Vaccination.—Dr. Clement Lucas writes to the *British Medical Journal* that the use of bovine lymph has, in his practice, been more often followed by sore arms than when he relied upon the arm-to-arm method. He believes that he has found an easy and safe method by which to stay the inflammation in short order. His recommendation is the following: "Should, then, the vaccination pustules on the twelfth or fourteenth day tend to become confluent, while the inflammatory areola tends to spread beyond the usual limits, the glands in the axilla to enlarge and the arm, perhaps, to become edematous, the author suggests that the area of the pustules should be powdered over with iodoform and a sterilized dry pad be applied to keep the powder in position and the pustules from friction. In this way the process is completely checked in twenty-four hours. The pustules dry into a cake, the redness subsides, the glands decrease and the edema of the arm rapidly disappears. This is in every way preferable to hot fomentations or antiseptic moist applications, which, apart from the difficulty of applying them to an infant, involve the healing of open wounds." The British practitioner still continues to make five insertions of the vaccine material, whether it be of bovine or human origin, a number of wounds that is seldom, if ever, made by an official American vaccinator. When the latter is persuaded that he is in possession of a bovine lymph of good quality he is ordinarily, at least in some parts of the country, content with a single and not large insertion-surface. Whether the British practitioner will readily recede from his old five-insertion method or not, we think it will be for the interest of himself and his clients to have this subject officially investigated by the very careful men who are now at work in endeavoring to replace arm to-arm methods with the glycerinated calf lymph. Sir Richard Thorne-Thorne, M.D., and Dr. M. Copeman are the intelligent subcommittee of the Local Government Board who are conducting this part of the official investigation on vaccination. The special report of the former member, quite fully illustrated, is before us, as is also a summary of that report as published in the *Lancet*.

Chronic Urticaria Treated with Sodium Nitrite.—Last summer I was consulted by a young lady for a chronic urticaria, in whose case the urticarial development was pronounced, the itching was great and at times the patient was so tormented that ordinary amusements were completely out of the question. Wherever clothing fitted snugly or any pressure brought to bear there speedily arose the large wheals and welts which persisted for hours. This had been her experience in summer seasons for many years and none of the many measures undertaken had brought relief. I could discover no intrinsic cause for the condition and knowing that much had been tried, I felt justified in attempting an experimental remedy. Regarding urticaria as an angioneurosis, I prescribed sodium nitrite in small doses, one grain three times daily. I was gratified the following day to be assured by the patient that she had experienced her first complete relief from the difficulty. And so through several weeks of hot weather, in which season she had been particularly subject to the difficulty, there was practically complete freedom from the annoyance before experienced, provided the remedy was continued in occasional doses. If it was discontinued for any period of time, the urticarial development would promptly reappear. Encouraged by this case, I took occasion to give the same remedy a few weeks later when consulted by another young woman for the same trouble, whose history had been much the same of many repeated failures of various methods. In this case, also, the relief was immediate and complete, and the occasional use for two or three days of the remedy sufficed to render the patient practically free from the annoyance which through years had been in each heated season of very great degree. In each of these cases the withdrawal of the remedy was followed shortly by the reappearance of the urticuria. After each reappearance the phenomena entirely disappeared on the administration of the drug. No other influences were brought to bear or known to exist. The conditions, therefore, amount to control tests in two cases whose histories had been of failure in repeated trials of many measures.—J. P. Sawyer, M.D., in the *Cleveland Journal of Medicine*.

Deligation Results Found Two Years After a Major Operation Upon the Neck.—Dr. Thomas reports the necropsy in the case of a man 65 years old who, two and one-quarter years previously, had cut the internal, external and anterior jugular veins, as well as the common carotid artery, in an attempt at suicide. At the time, hemorrhage was controlled by clamping and ligation; secondary hemorrhage occurring, it became necessary to ligate the internal and external carotids. The patient recovered and resumed his occupation as a house painter. This he followed for nearly two years, when he came under observation again on account of severe cough and pain in the right chest. The temperature was high and expectoration copious. Rapid failure took place and death ensued. Upon postmortem examination, the blood vessels forming the circle of Willis appeared normal. The last half inch of the internal carotid artery was hollow, while the portion in the cavernous groove was represented by a fibrous cord. Upon the left side, the sterno-mastoid muscle was entirely replaced by cicatricial tissue. The common carotid was small and terminated abruptly five inches from the arch of the aorta in a mass of scar tissue, there mingling with the cut ends of the pneumogastric, sympathetic and some cervical nerves. Above this fusion, nothing but the two nerves, vagus and sympathetic, and a small artery could be found. This artery, not so large as a normal facial, came down from above and gave off the small facial, lingual and superior thyroid, and was the sole representative of the external carotid. No trace of the internal carotid or of the internal jugular as far as the base of the skull could be found. The inferior thyroid artery was smaller on this side, but the left vertebral was half as large again as its fellow. This, in fact, appeared to be the only special provision made for collateral circulation. The deep cervical artery was much smaller on this side. The left lung was normal, and therefore had not suffered from interference with the pneumogastric and sympathetic nerve. Upon the right side the common carotid artery seemed slightly larger than normal, but the superior thyroid, the lingual, the facial and the inferior thyroid were apparently not enlarged. In the right lung pathologic changes, with a collection of pus, had caused death. The conditions present illustrate how little reliance can be placed upon the theoretic collateral circulation laid down in the text-books, based on ordinary anatomic anastomosis, for with the exception of the enlarged left vertebral artery and some little enlargement of the right common carotid, all the other arteries were not only no larger, but were actually smaller; even the deep cervical artery was considerably smaller than its fellow of the opposite side.—*British Medical Journal.*

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SATURDAY, NOVEMBER 6, 1897.

THE DEPARTMENT OF PUBLIC HEALTH.

It is with pleasure that we inform the members of the ASSOCIATION that the ASSOCIATION Bill to establish a Department of Public Health, and define its duties, has been approved in its entirety by the American Public Health Association at its last meeting at Philadelphia, and that body will co-operate with the ASSOCIATION and endeavor to have it placed upon the statute books.

There is some misapprehension in regard to the Bill, as appears by comments in certain newspapers, which should be relieved. In the first place, the ASSOCIATION yielded to the inevitable, no longer insisting that the head of the new Department should be a member of the Cabinet, to which position it heretofore found there were insuperable objections; objections which would indeed prevent the passage of the Bill should it be presented. The committee, therefore, have wisely framed their Bill on the lines of the Department of Agriculture, and there is little question but that in time the objections which now seem so unsurmountable will fade before the pressure of public opinion. However, the present proposition establishes the foundation and paves the way, but whether the period of trial will be long or short is of comparatively little consequence to the establishment and equipment of the new Department itself, which can run just as well if its head does not have that full measure of civic honor that the friends of the Department would like to see him have. At present, so far as the public is concerned, it is the efficiency of the service, and the thoroughness with which the new service shall cover the sanitary field, that they look to.

Some misapprehension has been felt and indeed expressed in some of the daily papers, to the effect that this measure was simply a revival of the old National Board of Health; that it was the establishing of a National Quarantine with greater powers; and to such we must reply that these misapprehensions are not founded on fact. In the first place, this Bill for the first time provides for thorough correspondence or conference to secure the co-operation of State, municipal and local boards of health "in establishing and maintaining an efficient and accurate system of notification of the existence and progress of contagious and infectious diseases and of vital statistics in the United States." While the proposed Bill goes further than any existing law in regard to the investigation of the cause of disease and the best means of its prevention, it makes no new regulation regarding quarantine. It takes quarantine as it finds it and simply transfers from the Secretary of the Treasury, a purely financial and commercial officer, the duties and supervision of so much of the work of the Marine Hospital Service as is included in this law, and so far as the service itself is concerned—an organization which, we are informed, attempted vainly to stem the tide of public opinion at Philadelphia by opposing the adoption of the measure—we have to say that it will make no difference to the officers of the service, so far as their duties are concerned, except that the head of the service, instead of reporting to the Secretary of the Treasury, will report to the Commissioner of Public Health, that is to say, that he will in future, if this Bill establishing a Department of Public Health shall become a law, report to some one presumably competent to give him advice and instruction—a position sadly needed when we consider the mismanagement of the present epidemic. The existing Quarantine laws then are transferred bodily from the Treasury Department to the Department of Public Health, a transfer which every dictate of humanity and of good government seems to suggest. The Bill goes further than any existing law in its utilization of the machinery of the present departments of government, and the great skill and adroitness with which the committee of the ASSOCIATION have prepared it, leaves all the departments and bureaus of the government in the same departments where they are now found. It simply provides for the better utilization of the information at their disposal, and affords a place for its collation and dissemination. The Bill also codifies all existing laws. That it is perfect in all details, we suppose is not to be expected so long as human nature itself is not perfect, but it is as near perfection as possible without further trial to secure it. We shall not only sincerely hope that every member of the ASSOCIATION will use his utmost influence to secure the passage of this wise, salutary and beneficent law, but that he will immediately write to his Member of Congress, and his Senators, giving them

the facts in regard to it, pointing out that the Bill, as already stated, differs from the old National Board of Health Act, inasmuch as it provides for a representative for every State Board of Health in the Union; that it consolidates the existing United States statutes; that it maintains all good and effective laws now in force, including the National Quarantine Act, and the Interstate Quarantine Act, and that it provides for the utilization of all information in the hands of the various departments, and affords a proper and suitable place for dissemination and promulgation. The Bill unloads the overloaded Treasury Department from duties which, under the existing state of affairs, were only nominal, and places them where care and supervision can be exercised. As the Marine Hospital Service is not interfered with, except as to the officer to whom the chief of the bureau shall report, it is seen that the opposition to the measure is not only gratuitous and unnecessary, but unwise and unscientific. We, however, are of opinion that this alleged opposition is confined to a limited number of officers who are compelled to act under the instruction of the present chief, who is said to view any change of whatever character in the existing régime as a bad one. Write us for a copy of the bill.

THE PHYSIOLOGY OF THE THYROID GLAND.

The physiology of the thyroid gland is a subject that has been largely worked out within the past five or six years; that is, what we know of it with any degree of certainty. Theories had, of course, been offered and some of them have been confirmed; the brilliant therapeutic results following the physiologic investigations of SCHIFF, HORSLEY, VASSALE and GLEY and their practical application in myxedema are, as has already been stated in the JOURNAL, one of the most important of recent medical acquisitions and the one, perhaps more than any other, that illustrates the close relationship between physiologic research and rational therapeutics. The still more recent isolation of thyroiodin, which seems to be at least the chief of the active principles of the gland, has thrown additional light upon the subject. The old notion that the gland acts as an apparatus for regulating the cerebral blood supply and which was held as a possible truth as late as the 1892 edition of "Landois and Stirling's Physiology," is almost forgotten and thrown aside with the revelations of the secretory functions, previously suggested by ROGOWITSCH and so fully demonstrated by VASSALE, GLEY, BAUMANN and others within the past few years.

It is possible, however, that like some other glandular organs, it may have other functions than that of supplying to the organism some useful secretion or of disposing of some deleterious substance, and that there may be some truth still in the older hypothesis. In June of the present year, Professor CYON reported to the Paris Academy of Sciences that his experimental studies had led him to the opinion that all the chief phenomena of GRAVES's disease, the goiter, exophthalmus and the tachycardia, as well as the visceral disturbances, were explainable by the action on the heart and the thyroid of the sympathetic system influenced by the depressor nerve. In a still later communication to the same body (Sept. 12, 1897), he further reported that he had ascertained that the thyroiodin produced by the thyroid is a stimulant of the nerve centers that govern the heart and the circulation, and that the toxic substance removed from the blood by the gland is the iodin salts it contains, which have in their natural state a directly paralysant action on the depressor and pneumogastric nerves. It thus transforms a dangerous poison into a directly beneficial substance, the good effects of which he claims are not dependent upon the iodin contained.

The heart reciprocally acts upon the thyroid through the nerve filaments passing to the laryngeal nerves and thus controls the production of thyroiodin, which in turn is indispensable to its own normal function.

This secretory function, however, is not, according to Professor CYON, the only one possessed by the thyroid gland. He revives the old and neglected regulator theory of the thyroid function, and holds that, situated as it is near to the point where the carotid enters the cranium, it may act as a safeguard to the circulation, forming "a kind of secondary circuit of feeble resistance," and that this action is also presided over by the heart. This causing dilatation of the gland acts in two ways, 1, by opening the flood gates, so to speak, in cases of sudden danger; 2, by increasing the secretion of thyroiodin in case of permanent danger, and in either case the action is beneficial. The briefly reported communication does not give many details that might be desirable, but the above is its substance, and it certainly affords suggestions that can come into play in considering some of the facts already ascertained in regard to the functions and properties of the organ. The bearing of these ideas on the treatment of GRAVES'S disease is pointed out by CYON, especially as regards the indications for the use of thyroiodin and the very recently recommended section of the sympathetics. In cases of the vascular or ordinary hyperemic type of the disease the use of thyroiodin is counterindicated, and CYON recommends the internal administration of iodin, and in cases of imminent danger the section of the depressor nerves may be tried. The relation of the heart's condition to the varying thyroiodin contents of the gland is also suggested by these views, as a possible subject worthy of investigation and other questions bearing upon the commonly received and recent views of the physiology or functions of the thyroid gland will readily occur to the reader. If, for example, its function is to transform and neutralize

iodin as a toxic agent in the blood, how will this fact bear upon that other view recently advanced and claimed to be supported by good evidence, that its goitrous hypertrophy is associated with a deficiency of that substance. Professor CYON'S views are certainly suggestive of some modification of recent physiologic theories and his communication ought to be an incitant of further studies on some of these points. He does not confine the regulatory action in the circulation to the thyroid alone, but suggests as possible that the thymus, situated near the entrance of the vertebrals into the cranium, the accessory glands situated near vital organs firmly enclosed in sheaths like the kidneys and testicles, and the pituitary body may also have this office to some extent as well as that of furnishing an internal secretion. In the course of time the substance of his investigations should appear in a more elaborated form and we can better estimate the validity of his conclusions.

FAITH-CURE AND HYSTERIA IN THE NINETEENTH CENTURY.

A recent discussion, before the Chicago Physicians' Club, of faith-cure, by several clergymen, led to assertions monotonously familiar to students of the fetichic side of medicine. The Club likes to amuse itself, and sometimes at its own expense. One of the gentlemen present reported two miracles at Lourdes. The gentleman conscientiously believed himself free from a bias to which his training as an ecclesiastic however strongly predisposed him. Moreover, his surroundings at Lourdes further biased him in the belief that miracles could be there performed. He was therefore in no judicial frame of mind when he saw in the midst of an enthusiastic crowd of fanatics, a "woman with a cancer extending from the lip to the breast cured in an instant." The case, as seen during the enthusiasm of a crowd, with no opportunity for calm investigation, could have been a pure suggestion. Its occurrence has been repeatedly denied by other more judicial investigators. ZOLA (preface to "Lourdes") thus sums up the evidence as to a precisely similar case which took the place of the first after its novelty had worn off.

"I interviewed a number of people at Lourdes and could not find one who would declare that he had witnessed a miracle. All the cases which I describe in my book are real cases in which I have only changed the names of the persons concerned. In none of these instances was I able to discover any real proof for or against the miraculous nature of the cure. Thus in the case of Clementine Trouve (who figures in my story as Sophie) the patient, who, after suffering for a long time from a horrid open sore on her foot, was suddenly cured, according to current report, by bathing her foot in the piscina, where the bandages fell off and her foot was entirely restored to a healthy condition. I investigated the case thoroughly. I was told that there were three or four ladies living in Lourdes who could guarantee the facts as stated by little Clementine. I looked up those ladies. The first said no, she could not vouch for anything. She had seen nothing. I had better consult somebody else. The next answered the same way, and nowhere was I able to find any corroboration of the girl's story. Yet the little girl did not look like a liar and I believed that she was fully convinced of the miraculous nature of her cure. It is the 'facts,' which of themselves lie. Lourdes, the grotto, the cures, the miracle, are indeed the creation of the need of the occult, that necessity for credulity which is a characteristic of human nature."

The case which came under the gentleman's own observation, and for which his evidence must be accepted, was one of hysteria from utero-ovarian disorders. Certain surgeons and physicians assumed that the hysteric symptoms were due to the utero-ovarian condition and proposed operation. This was not consented to, and the patient went to Lourdes, where she recovered from her hysteric symptoms, albeit the utero-ovarian state remained unchanged. This case recalls the very similar "miracle" of JOHN ELIOT, the Apostle to the Indians, of which Dr. OLIVER WENDELL HOLMES gave the following characteristic explanation:

"I do not want to say anything against MARY CHASE, but I suppose that getting nervous and tired and hysteric she got into bed, which she found rather agreeable after too much housework and perhaps too much going to meeting, liked it better, curled herself up into a bunch which made her look as if her back was really distorted, found she was cosseted and posseted and prayed over and made much of, and so lay quiet until false paralysis caught hold of her legs and held her there. If some one had hollered fire it is not unlikely that she would have jumped out of bed as many other paralytics have done under such circumstances. She probably could have moved enough if any one could have made her believe that she had the power of doing it. *Possumus quia posse videmur.* She had played possum so long that at last it became non-possum."

The epidemic of faith-cure just now prevailing takes its root in the old fetich practices of Shaman priests when medicine and theology were one. Great as have been the claims for Lourdes they do not exceed those made for that self-deluded faith-curer, VALENTINE GREATRAKES. He was a man of considerable culture for the seventeenth century. An officer in CROMWELL'S army, a pious puritan, he never molested other religionists over whom he was placed in Ireland. After the Restoration, VALENTINE GREATRAKES, according to JEAFFERSON, lost his office and was reduced ("Stories About Doctors") to a private gentleman. On his small estate he labored on with good results, introducing into his neighborhood a more scientific system of agriculture giving an unprecedented amount of employment to the poor. He missed the excitement of public business, and his energies deprived of the vent they had for years enjoyed made him the victim of his imagination, which acting on a mind educated in a school of fanatic introspection led to a series of remarkable delusions.

He first had attacks of pensiveness and dejection; ere long he had a "strange persuasion" in his own mind, of which he was not able to give rational account, that he could cure the "king's evil." Patients afflicted therewith were in due course brought before him and on his touch they recovered. When the royal touch was believed in as a cure for scrofula the distinction between strumous and other swellings was by no means clear even to physicians of repute. Many who underwent the manipulation of "annointed rulers" suffered only from swellings, from which as a matter of course nature would in a few weeks have relieved them. Many of VALENTINE'S patients were evidently suffering not under scrofulous affections but comparatively innocent tumors. A second impulse gave him the power of curing ague. A third inspiration, or "celestial aura," imparted to him the command, under certain conditions, over all human disease. His methods of operation were various. When an afflicted person was laid before him he usually offered up a prayer to God to make him the humble instrument of divine mercy. Invariably, when a patient derived benefit from his treatment he exhorted the patient to offer up thanks to God. After the initiatory supplication the operator passed his hands over the affected part of the sick person, sometimes over the skin itself and sometimes over the clothes. The manipulations varied from delicate tickling to violent rubbing, according to the nature of the demon by which the diseased people were tormented. GREATRAKE'S theory of disease was the scriptural one. The morbific power was a devil, which had to be expelled from the frame in which it had taken shelter. Sometimes the demon was exorcised by a few gentle passes; occasionally it fled at the verbal command of the physician, or retreated on being gazed at through the eyes of the mortal it tormented, but frequently the victory was not gained till the healer rubbed himself into a copious perspiration. Dr. HENRY STUBBE, a famous physician in Stratford-upon-Avon ("Miraculous Conformist," 1666), gives the following testimony to GREATRAKES:

"Proofs that he revives the ferment of the blood.—Mr. BROMLEY'S brother of the Upton-upon Severne, after a long quartane ague had by a metastasis of the disease such a chillness in the habit of the body that no clothes could possibly warm him; he wore upon his head many spiced caps and tenne pounds weight of linnen on his head. Mr. GREATRAKES stripped him and rubbed him all over, so that the bath never heated him up as did the hand of Mr. GREATRAKES; this was his own expression. But Mr. GREATRAKES, causing him to cast off all that multitude of caps and cloths, it was supposed that it frustrated the happy effect, for he felt the recourse of his disease in some parts, which rendered the cure suspicious. But as often as Mr. GREATRAKES came and rubbed him he would be all in a flame againe for half an hour. The experiment whereof was frequently practiced for five or six days at Ragly."

GREATRAKES himself speaks of his more violent curative exertions making him very hot. But only occasionally had he to labor so vehemently. His eye (the glance of which had a fascinating effect on people of a nervous organization) and his fantastic ticklings usually sufficed to produce the results required.

The fame of the healer spread far and wide. Not only from the most secluded parts of Ireland, but from England, the lame and blind, the deaf, dumb and diseased made pilgrimages to the Squire of Affane. His stable, barn and malthouse were crowded with wretches imploring his aid. The demands upon his time were so many and so great that he set apart three days in the week for the reception of patients and on those days from six in the morning till six in the evening he ministered to his wretched clients. He took no fee.

He did not profess to be able to cure everyone. An adverse influence such as the sins of a patient or his want of faith sufficed to counteract the healing power. GREATRAKES could affect only those who were susceptible. The people of Warwickshire crowded by thousands to him and he touched, prayed over and blessed them and sent them away rejoicing. From Rugby he went to Worcester, at the request of the lord mayor and aldermen of Worcester, and from Worcester he was carried up to London. Lord ARLINGTON commanded him "to appear at Whitehall and tumble in his particular fashion" for the amusement of CHARLES II. A man who could cure gout by a touch would have been an acquisition to the court which then ruined English manners. Fashion and wary opulence laid their offerings at his feet. For a time he ruled from Soho to Wapping. Justice GODFREY gave him rooms for the reception of patients in his mansion in Lincoln's Inn Fields, and thither flocked the mob of the indigent and the mob of the wealthy to pay him homage. Mr. BOYLE (the brother of the Earl of Orrery), Sir WILLIAM SMITH, Dr. DENTON, Dr. FAIRCLOUGH, Dr. FABER, Sir NATHANIEL HOBART, Sir JOHN GODOLPHIN, Dr. WILKINS, Dr. WHICHCOT and Dr. CUDWORTH were among his most vehement supporters of the sterner sex. But the majority of his admirers were women. VALENTINE GREATRAKES, as the lion of the season, performed with wondrous results on the prettiest or most hysteric of the ladies present. His intimate friends held that the curative property that came from him was a subtle aura effulgent and of an exquisitely sweet smell that could only be termed the divine breath. According to Dr. HENRY STUBBE:

God had bestowed upon Mr. GREATRAKES a peculiar temperament or composed his body of some particular ferments, the effluvia whereof being introduced, sometimes by a light, sometimes by a violent friction, should restore the temperament of the debilitated parts, reinvigorate the blood and dissipate all heterogenous ferments out of the bodies of the diseased by the eyes, nose, mouth, hands and feet. I place the

gift of healing in the temperament or composure of his body because I see it is necessary that he touch them. Besides, the Right Honorable Lord CONWAY observed one morning, as he came into his lordship's presence, a smell strangely pleasant as if it had been of sundry flowers, and demanded of his man what sweet water he had brought into his room he answered none, whereupon his lordship smelled upon the hand of Mr. GREATRAKES and found the fragrancy to issue thence, and examining his bosom he found the like scent there also. Dean RUST gave similar testimony, and "Sir AMOS MEREDITH, who had been Mr. GREATRAKES' bedfellow, did the like,"

VALENTINE GREATRAKES' triumph was, however, of short duration. His professors were made the butt of ridicule, to which his presence of mind and volubility was unable to respond with effect. His enemies asserted that his system was only a cloak under which he offended the delicacy of virtuous women and roused the passions of the unchaste. His conversation was represented as compounded of the blasphemy of the religious lunatic and the blasphemy of the obscene profligate. His boast that he never received for his remedial services was met by a flat contradiction to the effect that he received £500 at a time from one individual. The last accusation was never absolutely disproved. The tide of slander was too strong for him. He retired to his native country. Of his sincerity at the outset of his career as a "healer" there can be little doubt. In many respects GREATRAKES resembled the paranoiac "SCHLATTER the Healer," who died a victim to a self-imposed journey during a forty-day fast and was later personated in Chicago by "Rattlesnake Dick," whom Dr. RAUCH more than once drove from Illinois.

What is to be regretted in the Chicago Physicians, Club discussion is that men without medical education and judicial training as to the value of evidence were permitted to speak with authority on a subject as to whose merits experience has demonstrated evidence like theirs to be totally valueless. The invitation, even though rescinded, to a "healer" (notoriously driven from Omaha on excellent legal grounds, by the health authorities) was especially to be regretted. Every newspaper in Chicago exploited this invitation in a way that can not fail to add to this man's dupes.

THE EVILS OF TEA-DRINKING.

In these days of Tea-worship it is well to call attention occasionally to the deleterious effects of the excessive use of this beverage. In their ardent advocacy of the "cup that cheers but not inebriates," the apostles of temperance are too prone to forget that there are other intemperances than alcoholic ones, and of these none is more vicious than the pet vice of refined and polite society, tea-debauchery.

In former years the tea-drinkers were usually to be found among nervous old persons. The association of the fidgety old maid and her cup of tea is proverbial. In the present day the temptation of tea-tippling is persistently offered to us from childhood, and nearly every one is more or less addicted to its use. The fashionable afternoon tea has done much to extend and perpetuate the vice. Otherwise sensible and temperate men and women will actually indulge in tea-debauchery to the extent of as much as a dozen cups during the social duties of a single afternoon. Such excess is not generally the result of wilfulness or pernicious desire, but is due to the innocence of the baneful results of the practice, and is thus capable of correction by a campaign of education.

The manner in which the tea-habit has increased is alarming; it is fast becoming universal. It almost seems that soon only those already addicted to some other form of intemperance will form the abstemious class. Tea is drunk at all hours, with food and without, and is taken hot and cold. There is some excuse for the popularity of the hot infusion. In common with other hot beverages it is very acceptable as a stomachic and general stimulant, but it is the heat and not the infusion that stimulates. A cup of hot bouillon will always prove as agreeable and more nourishing and stimulating. No excuse can be found for the senseless habit of drinking the usually harmful iced tea. It is simply an expression of the natural perversity of human nature when given up to a pernicious habit; unsatisfied with the excess in its ordinary form, some new means, without reason or advantage, are devised for its more elaborate practice. In warm weather many other cold beverages are better. Unless excessively sweetened, lemonade, orangeade, etc., are vastly more palatable and certainly harmless. Another folly of the tea-drinker is dilution of the infusion with milk, and further perversion with sugar. The ill effects of tea-drinking are sufficiently plenteous without the addition of the large amount of sugar taken daily, cup by cup, by a tea devotee, in itself quite sufficient to cause obstinate gastric derangements and their manifold complications.

Tea leaves contain from 2 to 4 per cent. of an active principle variously called thein, caffein and guaranin, a volatile oil giving odor and flavor, and tannin or tannic acid in the proportion of about 15 per cent. The alkaloid is found in combination with the tannic acid. Fortunately, since the establishment of rigid tea inspection, metallic adulterants, such as lead, formerly used to color black tea, need not be considered. Ordinary tea-drinkers simply infuse the leaves with hot water for a short time and in this manner the alkaloid and the aromatic elements are extracted without any undue proportion of tannin. In many households, however, tea is allowed to stand in the pot, either on the table or on the stove, or is actually boiled; in such a case a large proportion of the harmful tannin is taken up by the infusion. The least injurious beverage is that prepared by infusing the leaves

with boiling water for a very short time and immediately pouring the prepared infusion away from the leaves and sediment.

The deleterious effects of tea are in some degree due to the alkaloids, which when taken in constant or excessive doses produce insomnia, restlessness, mental depression and general nervous derangement. Occasional small doses act as cerebral stimulants; poisonous doses may produce great prostration and death. However, the greatest injury of tea-drinking is due to the astringent action of the tannin ingested; what may be called a tanning of the sensitive mucous membrane and its contained glands along the whole gastro-intestinal tract is gradually effected. This leads to a loss of sensibility to food stimuli, imperfect secretion of the digestive elements and insufficiency of intestinal movements, resulting at first in flatulence and chronic constipation and ultimately in obstinate indigestion and its associate and consequent evils. It is true that occasionally a cup of hot tea does stimulate digestion, but it is the heat that stimulates and not the alkaloid.

Excessive coffee-drinking is also an obnoxious habit, although in a less degree than tea-drinking. Dyspepsia, insomnia, cardiac derangements and other ills are laid at its door. On account of the identity of their alkaloids there has been a general disposition to consider tea and coffee the same in their physiologic effect. This idea is erroneous, as the alkaloids are not the only constituents of these substances. Exclusive of its alkaloids, coffee contains aromatic and other agents which render it a stimulant to the whole digestive tract—sialogogic, stomachic, carminative, deodorant, and mildly laxative. Tea has no such auxiliary effect on the digestion, and in constant and excessive quantities impedes and destroys it. In addition coffee has been proven to be a more prompt and efficacious nerve restorant.

While protesting against the pernicious use of either substance as a daily beverage, from a medical standpoint, our preference is emphatically for coffee. Contrast the vigorous, refreshing odor and flavor of a good cup of coffee with the delicate fragrance and insipid taste of even a high grade tea; contrast the clear complexion and general physical aspect of the individual whose morning meal is a bowl of diluted coffee and who takes his after-dinner cup, with the nervous, emaciated, habitually constipated dyspeptic whose "eye opener" and "night cap" is tea, and all reason for argument as to our preference ends.

CORRESPONDENCE.

Medical Law in Wisconsin.

MILWAUKEE, Oct. 26, 1897.

To the Editor:—In the article on "National Medical Legislation," by Dr. Greeley, in the JOURNAL, October 23, the Secretary of the Wisconsin State Society is quoted to the effect that we have no efficient medical law in the State. That was undoubtedly true when Dr. Greeley got his information, but it is not true now. We have a law which has been in operation several months and is working well. The law established a State Board of Medical Examiners. A diploma from a recognized medical school or satisfactory examination before the Board is required.

My impression is that Dr. Greeley's article is incorrect as regards Indiana. I am quite sure that this State also has recently enacted a very efficient law.

Very truly yours, GILBERT E. SEAMAN, M.D.

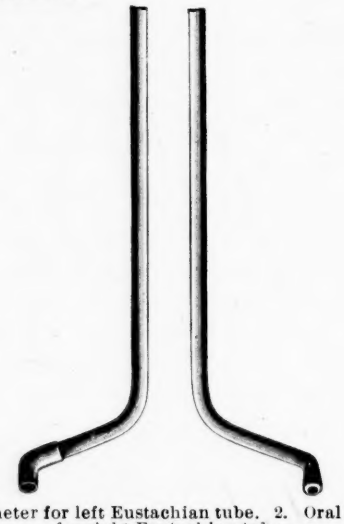
NEW INSTRUMENTS.

ORAL RIGHT AND LEFT EUSTACHIAN CATHETERS AND TENT HOLDERS.

BY EPHRAIM CUTTER, M.D.
NEW YORK.

Experiment has shown that the Eustachian tubes have three angles each of 45 degrees, viz.: 1. Upward from the horizontal pharyngeal plane. 2. Outward right and left from a vertical antero posterior medium pharyngeal plane. 3. Backward from a medium transverse pharyngeal plane.

It is evident that if these angular measurements are correct for the average Eustachian tubes, the catheters for them must conform to these angles. Again, the access through the mouth behind the soft palate is freer and easier than through the narrow nares with sensitive cavernous erectile tissues on the turbinated bones and with a vomer, all which often are irregularly formed, placed and twisted, hindering facile movements to the catheters, Eustachian.



1. Oral catheter for left Eustachian tube. 2. Oral tent holder for right Eustachian tube.

Again, if the aurists are rhinologists, the mirror will allow "them" (him or her) to see the catheter enter or entered into the Eustachian tube, so that its penetration is proved by sight. With these contrivances it is hoped that operators will find access to the Eustachian opening better than with the conventional catheter which does indeed turn upward and outward but not backward.

Prof. J. Solis Cohen, of Philadelphia, recommends that patients have their own oral catheters. The material is silver or German silver.

Of course these angles will not suit all cases, as it has been found that the Eustachian orifices vary. But when the catheters are introduced *per os* it is easy to adjust them to these variations, which adjustment is impossible when the catheter enters through the nares.

Some years ago the writer made oral Eustachian catheters

somewhat on these angles but they were defective because they did not have in addition the upward 45 degree angle which the present models submitted possess.

A New Transportable Medical Illuminator is described in the *Jour. Méd. de Paris*, which is merely a piece of platinum "moss" set in the center of a reflector and attached to the ordinary Paquelin thermocautery in the place of the knife. The illumination produced is said to equal that of quite a strong electric light. The thermocautery apparatus can be substituted by a still simpler contrivance, a tube containing a sponge moistened with kerosene, connected with a Richardson bulb and cock.

Pendulum Apparatus for Stiff Fingers and Wrists.—It has been six years since Krukenberg first suggested applying the principle of the pendulum to an apparatus to correct stiff articulations. Nebel has now perfected a small instrument for the purpose which accomplishes the desired result with astonishing rapidity and ease. It is attached to a small board clamped to the edge of a table, on which the hand rests, with the pendulum swinging freely below. It can be adjusted to any size and to any part of the hand or wrist. It is described in full with four cuts in the *Ztschrft. f. Orthop. Chir.*, Vol. v, No. 1. Nebel states that patients who used to resist and scream at all his manual attempts to mobilize their joints, now accomplish it alone, with this simple little apparatus, in an incredibly short time.

The Wire Saw in Trephining.—The JOURNAL quoted an article in the issue of September 5, on the advantages of Gigli's wire saw, which stated that for all bone sections except those of the skull, it seems to be an ideal instrument. The next foreign mail brought an article in the *Cbl. f. Chir.* of August 14, by Prof. A. Obalinsky on the technique of trephining based on a wide experience, and the instruments recommended are Collin's crown perforator and Gigli's wire saw. A tongue-shaped flap is cut in the soft parts and raised. Five to seven holes are then made with the perforator, through the entire thickness of the skull down to the hard membrane, two at the base of the flap and one at the tip, with the rest regularly arranged along the sides. The membrane is detached from the skull with a fine elevator and the wire saw introduced at one hole and passed through and out at the next, held in a Deschamps needle, a curved canula or an ear sound. There is no jar, no traumatism, and the bone is cut clean and exactly where required close to the root of the broad flap, which rapidly heals into the tissues when replaced.

PUBLIC HEALTH.

Bicycle Accidents 10 per cent.—Out of 4,000 claims reported by the Ætna Life, 981 were due to falls, 481 carriage and wagon accidents, 413 bicycle accidents, 264 cuts, 194 falling of heavy articles.

Health Association Names Officers.—The American Public Health Protective Association elected the following officers: President, Charles A. Linsley of New Haven; vice-presidents, Benjamin Lee, Philadelphia, and John C. Schrader, Iowa City, Iowa; secretary, Henry C. Probst, Columbus, Ohio; treasurer, Henry C. Holton, Brattleboro, Vt. Ottawa was chosen for the convention of 1898, and Knoxville has put in a claim for 1899.

Instruction in State Medicine.—Hamline University of Minneapolis, Minn., as per catalogue for 1896-7, has established a chair of preventive and legal medicine and medical insurance. C. A. McCollom, M.D., head physician Modern Woodmen of America, is the lecturer. The medical branch of the above university is known as the College of Medicine (Minneapolis College of Physicians and Surgeons). We congratulate the institution on this advanced movement.

On Noise Nuisances Dangerous and Detrimental to Health.—Several letters have lately appeared in the daily newspapers, one of which made remarks as follows: The nerves of the ear are the most sensitive of the whole body, except those of the eye. Every harsh sound which strikes the ear throws the particles of the brain into commotion. This incessant vibration caused by the incessant discords of a city like New York does much to impair health. It may not be noticed by many who have grown used to it, or as Josh Billings would have said "become manured to it," but whether they notice it or not their brain matter is vibrating in unison with every harsh noise that strikes their ears. In many diseases, especially the diseases incident to brain work, discordant noises are not merely disagreeable. They are deadly. The Board of Health knows this. It also knows that a very large part of the population of New York is doing indoor work and is liable to the nervous troubles incident to it.—*Public Health Journal.*

On the Milk Supply of Cities.—Among the papers read before the National Conference of Mayors and Councilmen, held at Columbus, Ohio, during the last week of September, was one on "The Influence of a Pure Milk Supply on the Death Rate of Children," by Nathan Strauss, of New York, the founder of the depots for the supply of sterilized milk to the poor. In the course of it, he said: "There is practically no milk delivered for general consumption in cities that is fit to be fed in its natural state to young children." After having given a large number of mortality statistics and outlined the work done by him in establishing pure-milk stations in the City of New York, he went on to say: "I think I have fairly demonstrated the proposition that many thousands of infant lives are annually sacrificed by the neglect to supply, for the nutriment of children, milk which has been sterilized. I hold that neglect to be criminal, and I leave it to you to fix the responsibility for it. We punish murder with the penalty of death, and yet we allow murder to be committed by the wholesale in every populous community of this land, with no thought of its punishment and little thought of its prevention."

Violent Deaths in Great Britain in 1896.—Some interesting statistics have recently been printed in London relative to deaths by accident in Great Britain. From these figures it appears that while 824 deaths were attributed to railroads in one year, there were no less than 1,054 people killed by vehicles other than railway. Of these, 236 deaths were caused by vans and wagons and 372 by carts. Besides these, 273 deaths are put down as being attributed to horses. The destructiveness of water appears in the item of 2,172 deaths caused by drowning. Lightning killed 15 people and sunstroke 41, while 91 died from exposure to cold. No less than 348 of the male sex were sent to their final account by falling down stairs, and 50 met their doom by tumbling out of open windows. Sixteen people died from football, while the game of cricket is responsible for the demise of three. Two deaths are ascribed to tight boots and one to barbed wire. In the cases of burns, scalds and explosions, English women are more unfortunate than the men. From this source 1,186 females met their death, as against 1,005 men; but when it comes to suicide the men have the call, as 2,052 males shuffled off the mortal coil by their own hands, while only 677 women committed self-destruction.—*Indemnity.*

Sanitation of Dairies.—To make good butter one must have good milk, and this comes only from healthy cows, fed on good sweet pasture or on good sweet grain and other forage, and which have pure water to drink and pure air to breathe. Certain obnoxious weeds, leeks, wild onions, ragweed and others, give the milk and the butter made from it a decidedly bad flavor; so also does damaged, rotten silage, moldy corn fodder or hay, and musty, damaged grain. Impure water has its effect, both on the health of the animals and the quality of the milk. In many pastures are some small pools in which the

cows stand during the heat of the day to rid themselves of flies. The water in these becomes filthy and is kept stirred up by the movements of the cattle, and where, as is often the case, it is the only water obtainable, the cows are compelled to drink it. This can usually be avoided by fencing the pond and keeping the cattle out. If this water is needed for the cattle it can be drawn out in a pipe laid on the lower side in trough from which the cows can drink. In a close, crowded and ill-ventilated stable, where there is too little air space for each animal, the air becomes foul from the exhalations, and this affects the milk as well as the health of the animals. The remedy in this case is to provide more room for the stock and better ventilation. The stable should be kept as clean as possible and the cows well bedded and clean. The utmost cleanliness should be observed in milking. All dirt should be brushed from the cow before beginning to milk, and it is best to dampen the udder and flank of the cow to as to prevent the dust and fine dirt from falling into the milk. The milk should be strained immediately after milking and not allowed to stand in the cow stable any longer than absolutely necessary.—*Bulletin United States Department of Agriculture.*

The Opinion of the Quarantine Officer of the Louisiana Board of Health.—Dr. C. P. Wilkinson, formerly President of the Louisiana Board of Health, and at present Resident Physician at the Mississippi Quarantine Station, writes the *Times-Democrat* as follows. His opinion is not only valuable, as being the deliberate judgment of an officer of many years' experience, but from a historic standpoint:

HOW THE FEVER GOT IN.

[From the New Orleans Times-Democrat, Oct. 25, 1897.]

Mississippi River Quarantine Station,
Oct. 23, 1897.

To the Editor of the Times-Democrat.

In the summer of 1874 yellow fever broke out at Fort Barrancas, Fla., on the west shore of the entrance to Pensacola Bay. The disease rapidly spread in the garrison. Dr. Sternberg, post surgeon of the fort and now Surgeon General of the Army, having a very severe attack. Rigid investigation into the source of the disease failed to locate its origin. Some time after the subsidence of the epidemic at that post it was learned that a bark sailed into the entrance to the bay one summer evening and at dusk cast anchor at no great distance from the fort. After dark two soldiers from the garrison clandestinely visited this bark, making some purchases, remaining on board some hours. At daylight in the morning the bark sailed on to the quarantine station, further up the bay. This bark was from Havana, and had on board at the time several of the crew ill with yellow fever. The two soldiers who had gone on board were the first taken ill with yellow fever at the fort.

In 1886 yellow fever appeared at Biloxi, Miss. The origin of the case was undeniably traced to communication with infected vessels at the Ship Island Quarantine Station. These two incidents are cited to show how easily contagious diseases may be carried from infected premises, and also to show that notwithstanding the discipline of the army and of the national quarantine service how easily either or both may be evaded.

In 1887 the citizens of Biloxi and of other points on the Mississippi Sound urged upon their Congressmen the request that the Ship Island Quarantine Station should be removed to some other more remote locality. The reasons that this removal should be caused were patent to all, the principal one being the impossibility of preserving isolation of vessels in quarantine at that place. To one familiar with the Sound coast this argument was insuperable. The Mississippi Congressmen in their efforts to secure the passage of the act of Congress necessary were wisely and ably seconded by the then Surgeon General of the Marine-Hospital Service, Dr. John B. Hamilton, who readily saw the necessity of such removal. Congress passed the act in 1888. Surgeon General Hamilton appointed a commission to select a better site for the station. He appointed Surgeon W. H. Hutton, after whom the mechanics' detention camp at Avondale is now named. Assistant Surgeon H. R. Carter, now in New Orleans, both of the Marine-Hospital Service; Capt. Parker of the coast revenue cutter; and, to show his deference to the people and the interests of the vicinity, invited the people of Biloxi to name the fourth, and the Louisiana Board of Health to name the fifth member of the commission. Dr. Maybin was named by Biloxi and I was named by our Board of Health. After careful examination of the various possible locations for a quarantine station the northern end of Chandeleur Islands was unanimously selected by this commission as being admirably adapted to the purpose. The location was accepted. A quarantine plant was there erected.

Ship Island Quarantine Station was abandoned, and the buildings being considered infected, were burned. In 1893 a terrible storm swept across lower Louisiana and Mississippi. The Louisiana Quarantine Station, erected at about the same time as the Chandeleur Island station, because of superior construction, passed through the hurricane without loss of life and with little damage to property, and was at work disinfecting vessels the next day; whereas the Chandeleur Island Station, because of inferior construction, for which the national government is responsible, was demolished, and the next day nurses, patients and stewards were floating about the Gulf of Mexico, drowned and killed in the wreck.

The following year the Marine-Hospital Service moved the quarantine station back to Ship Island, in spite of the wishes and in defiance of the protests of the inhabitants of the Sound coast, and with amazing and fatal disregard of the elementary principle necessary for a properly located quarantine station, *i. e.*, the possibility of isolation.

From Ship Island Quarantine Station has come to the Southern country this visitation of yellow fever. Dr. Guiteras states that this visitation, like all our visitations, has come from Cuba. It is a matter of record that the widespread epidemic of 1847 was brought from Vera Cruz by our returning soldiers from the Mexican war. The fever of 1867 was brought from Mexico to Indianola and thence to New Orleans.

The following showing the arrival of vessels at Ship Island Quarantine Station from June 11 to August 4 of this year will furnish much food for reflection. I have excluded the arrivals previous to and subsequent to the first and latter, respectively, of the above dates, and I have also excluded all arrivals except those from badly infected ports:

ARRIVALS AT SHIP ISLAND QUARANTINE FROM CUBAN PORTS.

June 11.—Schooner Oscar G., from Havana.
June 12.—Brig Estella, from Havana; one case yellow fever in quarantine.
June 12.—Schooner Eleanor, from Havana; five cases intermittent fever in quarantine.
June 14.—Schooner Iolanthe, from Cienfuegos.
July 7.—Schooner H. J. Powell, from Havana.
July 11.—Schooner Florence and Lillian, from Sagua.
July 14.—Schooner James Slater, from Sagua.
July 19.—Schooner Pickup, from Cardenas.
July 20.—Schooner Charles Fowler, from Calbarien.
August 4.—Schooner Eleanor, from Havana.

The sanitary inspector, United States Marine-Hospital Service, stationed at Havana, writes under date of June 19, 1897, to the Surgeon General:

"American schooners laden with lumber from the ports in the South still continue to come to this port and they invariably go to Talapiedra wharf, where they remain seven to ten days. There are two such vessels at that wharf at present writing."

All summer long the above is repeated from Havana nearly every week to the Surgeon General. Talapiedra wharf has long been considered the most dangerously infected place in all Havana. All the officers of the quarantine service on the lower Mississippi are very keenly alive to this fact, and pay very particular attention to vessels from that locality. All practical quarantine officers know very well that vessels from that wharf are always very dangerously infected, and that isolation and disinfection must be extreme to treat them successfully. Now, where do these American schooners, laden with lumber, going to Havana, sail from? Ocean Springs, Scranton, Ship Island, the Mississippi Sound coast! Who are they manned and officered by? Residents of the Sound coast! That the men on board these vessels and their friends from the shore hold liberal communication both before and after disinfection is a foregone conclusion to everyone who knows the number of boatmen, fishermen and pilots along the Sound coast, and also knows of the quantity of smuggled goods, and of the rumors of organizations of smugglers who sail in and about the shipping in Ship Island harbor. Isolation is essential to the success of any quarantine station. Isolation can not be and has not been maintained at Ship Island quarantine.

Another port very highly infected, Colon, has sent infected schooners to Ship Island Quarantine Station. Arrivals at Ship Island Quarantine from Colon:

July 13.—Schooner Aloha, two cases malarial fever; in quarantine.

July 25.—Lena R. Storer, two cases malarial fever; in quarantine.

August 7.—Schooner Palos, three cases malarial fever; in quarantine.

It will be observed that everyone of these schooners had two cases of fever on board while in quarantine. If the doctor at Ship Island made a mistake in diagnosis, the disease may have been yellow fever, and the germs may have reached the coast from the Palos, the Storer and the Aloha.

The yellow fever prevailing at Colon this summer is of a very highly contagious nature. It came originally from Guayaquil to Panama, infected nearly every vessel trading at Panama; crossed to Colon and spread from there to Bocas del Toro, Port Limon, to Kingston, Jamaica, to Ship Island and to the Southern States. Early in the summer, vessels at Colon began losing passengers and men from yellow fever. Cases were dropped from vessels sailing away from Colon at Barbadoes, at Tortugas, at New York. Vessels coming here reported the loss of passengers at sea who had been on shore at Colon, with symptoms which left no possible doubt in my mind they had died of yellow fever. How many other cases occurred of which I know nothing I can not say; they are probably numerous.

From every quarantine station reporting sickness on vessels from Colon, all save one reported yellow fever. The sole exception was the Ship Island Quarantine Station. Three vessels at that station from Colon, a highly infected place, with seven cases of fever on board! Three of those lumber-laden schooners laying seven and ten days in port and everybody on shore! It is almost certain that these seven were yellow fever. I say this with no uncharitable feeling for my brother physician in charge of that station; but the logic of facts points almost inevitably to that conclusion. Ask any practical seaman, any observer of human nature, if the friends and relatives of crews of vessels in quarantine, only ten miles away, will seek an interchange of visits! Visits to home, to loved ones, for gain in barter and trade; visits arranged by the grape vine telegraph or a code of signals; but visits which have brought to our Southern country countless cost in money and untold misery and woe and death. Respectfully,

C. P. WILKINSON, Resident Physician.

The Quarantine Methods a Constant Menace to the Mainland.—Dr. J. W. Belden of New Orleans, a homeopath practitioner of good standing, sends the following statement to the *Daily Picayune*, which, if true, throws a side light on the methods of quarantine at Ship Island:

"I did go over to Ship Island during the month of May last and contracted a case of yellow fever. I usually spend my vacations every summer over at Biloxi and a place over there. I am fond of piscatorial sports and as the fishing in Ship Island harbor is fine, I usually go over there to fish Spanish mackerel. During the month of May I made four excursions over to Ship Island and on the occasion of my last visit, late in the month of May, I met two of the nurses from the quarantine hospital and they informed me that they had several yellow fever cases in the hospital. I asked them if they did not fear spreading the disease among the people who were present on the wharf where the bumboat from Biloxi usually landed. The nurses laughed and said there was no fear as they had had a bath just before they joined the party of excursionists, but I was at the time of the opinion that this was not sufficient, as their clothing had not been disinfected. I said nothing at the time and a day or two afterward came to this city.

"Within nine days after this episode I was taken suddenly with a chill, my head ached and I suffered from severe pains in the back accompanied with nausea, although just before this I had been in perfect health. My temperature went up to 104 degrees and I sent for Dr. Charles R. Mayer. I had never had any experience in yellow fever cases, and neither had Dr. Mayer, but for two days I had a very high fever. After that terrible prostration followed and there was a total collapse.

"Six days after I was taken sick I returned to Biloxi, and, meeting Dr. Mayer, he remarked that my eyes were very yellow and said that my liver was in a fearful state and advised me to take a remedy. Since then I have had experience in yellow fever cases, and I am convinced that I had a Simon-pure case of yellow fever, and that I received the infection at Ship Island. I had all the symptoms, the headache, the backache, the high temperature, the gastric disturbance and the prostration which invariably follows an attack of yellow fever."

Dr. Belden said that the quarantine regulations at Ship Island had been very lax and that there was free communication with the mainland. On one visit which the doctor made to Ship Island, there were fifty-two vessels lying in the harbor waiting to load lumber, and the tug or bumboat made three trips daily from the mainland to the island, carrying a large number of passengers each trip. On the wharf where the tug landed its passengers, the nurses from the hospital as well as the employes, and ofttimes the crews of the vessels, resorted to hear the news of the day or to enter into conversation with the people from the mainland.

Dr. Belden said that he was a very sick man, and, although not being able to diagnose his own case, yet he thought the attack a very peculiar one. Recently he met Dr. Matas and described his symptoms accurately, and then gave him a brief history of the case. Dr. Matas immediately pronounced it a case of genuine yellow fever, and asked Dr. Belden to write up a history of the case and give it to him, which he promised to do. Subsequently he met Dr. E. S. Lewis and made a similar statement to him, and Dr. Lewis concurred in the opinion of Dr. Matas. He thought it was outrageous to put the pesthouse on Ship Island. It was infamous. Vessels come within a mile of the island and the place is frequented by fishermen and visitors from the mainland. There are no restrictions regarding communication with the nurses or employes of the pesthouse, nor yet of the crews of vessels, which, coming possibly from the foreign infected ports, can, and do, spread the disease. He was of the opinion also that the infection was carried in currents of air and would be dangerous even if the nurses did not have any communication with the people.

At the present time he felt better than he had felt in years, and, although he had tended many yellow fever cases since the prevailing fever was declared to be yellow fever, yet he had not been taken sick. He was convinced that he is now immune, for if he had not had yellow fever early in the season, he says he feels satisfied that he would have taken it from one or the other of the patients whom he attended. He says that he had patients who had the black vomit and he was covered with the vomit, yet he had not taken the fever, which corroborated his opinion as to the nature of the disease which he had in June last.

The only thing about it that was strange was that none of his family caught the infection from him. He said that he was very liable to catch fevers or any other prevailing disease and is usually among the first to take any sickness going around, hence he feels sure that he had the yellow fever and as far as he knows it was the first case in this city this year.

He earnestly advocates the removal of the quarantine from Ship Island to some more remote locality, and one not so easily accessible as is Ship Island.—*New Orleans Daily Picayune.*

Yellow Fever.—Our record last week closed with October 26. Since that date the dispatches have reported as follows: October 27, New Orleans, 52 new cases and 11 deaths; Biloxi, Miss., 12 new cases and 1 "suspicious" case; Scranton, 9 new cases and 1 death; Atlanta, Ga., 1 new case; Memphis, Tenn., 5 new cases and 2 deaths; Cayuga, Miss., 2 new cases, and 1 new case near Raymond. October 28, New Orleans, 65 new cases and 8 deaths; Clinton, Miss., 1 new case and 1 death; Edwards, Miss., 5 new cases; Cayuga, 1 new case; Mobile, Ala., 6 new cases and 4 deaths; Whistler, Ala., 1 death; Flomaton, 4 new cases; Montgomery, 9 new cases; Lapine, 1 death; Baton Rouge, La., 1 new case; Bay St. Louis, Miss., 12 new cases; Memphis, Tenn., 8 new cases and 2 deaths. October 29, New Orleans, 5 new cases and 5 deaths; Jackson, Miss., 10 new cases and 1 death; Mobile, Ala., 5 new cases and 3 deaths. October 30, New Orleans, 31 new cases and 6 deaths; Edwards, Miss., 1 new case; Nittayuma, 1 new case; Mobile, 9 new cases and 2 deaths. Heavy frosts are reported in Mississippi, but none at New Orleans. October 31, New Orleans, 35 new cases and 5 deaths, making a total of 1,506 cases with 170 deaths in that city; Montgomery, Ala., 6 new cases; Mobile, 11 new cases; Jackson, Miss., 2 new cases; Clinton, 2 new cases; Biloxi, 3 new cases; Memphis, Tenn., 3 new cases. November 1, New Orleans, 38 new cases, 12 deaths; Mobile, Ala, 9 new cases; Montgomery, 1 new case, 1 death; Bay St. Louis, 6 new cases; Biloxi, 6 new cases, 1 death; Durant, 1 death; Edwards, 1 new case; Memphis, Tenn., 2 new cases, 1 death; Nittayuma, Miss., 3 new cases, 1 death; Pascagoula, 3 new cases; Scranton, 3 new cases, 1 death. November 2, New Orleans, more hopeful on account of prevailing cooler weather, 33 new cases, 6 deaths; Montgomery, Ala., 2 new cases; Greensboro, 2 deaths; Speignens, 1 suspicious case among the State prisoners; Memphis, Tenn., 3 new cases, 2 deaths.

A Plea for a Department of Public Health.—At a meeting of the board of trade and transportation, held in this city on October 13, Dr. Warren E. Anderson of Pensacola, formerly a member of the Florida State Board of Health, read a paper advocating the creation of a United States Department of Public Health independent of the treasury, war, navy or any other department of the national government. He said that "uniformity of quarantine laws and regulations can be obtained only through federal control. This is greatly to be desired, as it alone can prevent the wild, reckless and absurd shotgun quarantines, allay panics, restore confidence and prevent commercial rivalry of seaports, in their greed for trade, from endangering the public health of the entire country. The State should be represented in the national health councils, and the laws there made should be executed through this representative. All sanitary or quarantine officials should be residents of the State whose health interests they are to protect, and no official should be appointed in the way of political preferment, but only upon personal qualifications approved by commercial organizations, where such exist. The foreign tonnage tax should be applied to the purposes of quarantine, and thus relieve the people and the commerce of the country from the heavy and unjust burdens laid upon them by the present system of health protection. The marine-hospital service should be remanded to the performance of that duty which it has so faithfully done for the past one hundred years—the care of sick and disabled American seamen. A failure upon the part of the Federal Congress to provide the citizen with adequate protection against the invasion of imported disease and the prevention of the recurrence of such scenes as are being enacted along the lower Mississippi Valley and the gulf coast, will be regarded as a national calamity."—*Medical Record*, October 30.

National Bureau of Health.—According to the *Medical Record*, Dr. A. Jacobi made the following motion at the recent meeting of the New York Academy of Medicine, October 21, which was carried unanimously:

"That the New York Academy of Medicine authorizes its president to call the committee appointed years ago, and never discharged, and direct it to resume its interrupted labors and to report to the Academy of Medicine, for presentation to the Congress of the United States for adoption, the old bill, or a new bill, or to support a proper bill offered by great medical or commercial bodies, contemplating the centralization under the National government of the means to protect efficiently the health of the American people against the importation and dissemination of contagious diseases."

SOCIETY NEWS.

The Sixth International Congress against the abuse of alcohol completed its labors at Brussels, September 3. Addresses were presented by Forel, Lejeune, L. Frank, Miss Gray, Destrees, Mahaim and others, all leaders in the struggle against the abuse of alcohol. The importance of an active propaganda was strongly emphasized as the first stage in the work, arousing and educating public opinion. The second stage is legislation providing for compulsory official education in regard to the evils of alcoholism, and the third stage is legislation dictated by an enlightened and convinced public opinion. Certain nations (Norway), after passing through all these stages, are now completely freed from the scourge. Others (Switzerland, Germany), are entering the legislative stage, to which Belgium is also aspiring. The advisability of a constant literature on the subject was recognized, and the suggestion made that, instead of founding new organs, special editions of some established organ might be issued as demanded. The paralyzing effect of alcohol, demonstrated by new instrumental tests, was presented in a forcible light. A colored African bishop portrayed the frightful ravages caused among his compatriots by the impure alcohols sold to them by certain European nations. At the banquet wine, cider and beer without alcohol were served as beverages and extolled for their extremely nutritive properties and agreeable flavor, although too sweet, perhaps, to suit the general taste. The complete report of the proceedings can be obtained from the Secretary, Dr. de Vaucleroy, 290 Avenue Louise, Brussels. The next Congress will convene at Paris in 1899.

The New York State Association of Railway Surgeons will hold its seventh annual meeting, New York City, November 16. The following papers are announced: "Neuropsychic Manifestations Subsequent to Fractures or Dislocations," by Thomas H. Manley, New York; "A Review of So-called Traumatic Neuroses," by W. B. Outten, St. Louis; "Alleged Injuries," by W. J. Herdman, Ann Arbor; "Medico-Legal Features," by Hon. L. L. Gilbert, Pittsburg; An Address, by Hon W. H. Baldwin, Jr., Pres. L. I. R. R.; "Medical Expert Testimony," by Clark Bell, New York; "Internal Injuries," by C. B. Herrick, Troy; "Primary Dressings," by C. S. Parkhill, Hornellsville; "Primary Hospital Treatment of Those Injured *en Masse*, by John F. Burns, Brooklyn; "Asepsis in Emergencies," by W. C. Wood, Gloversville; "Some Newer Antiseptics, Their Uses in Railway Surgery," by F. A. Palmer, Mechanicsville; "Intestinal Toxemia as a Factor in Retarding the Healing of Wounds," by Harvey P. Jack, Canisteo; "Injuries to the Nervous System in Railway Accidents," by Charles R. Phillips, Hornellsville.

BOOK NOTICES.

Bulletin of the Harvard Medical Alumni Association, No. 11. Paper, 76 pages. Boston: 1897.

This volume is a report of the seventh annual meeting, held in Boston June 29, 1897. The typography and workmanship, with the excellent paper, combine to make this a very attractive number.

Transactions of the Michigan State Medical Society for the year 1897. Cloth, 528 pages. Grand Rapids: 1897.

This is Vol. xxi of the "Transactions" and contains various reports, addresses on surgery, gynecology and medicine, the constitution, list of members and list of the medical societies in Michigan. In the Section on Medicine and Obstetrics there are fourteen papers; in the Section on Gynecology and Abdominal Surgery, eight, and in the Section on Surgery, fifteen papers, printed in full, in many cases with discussion. The volume is a credit to the Society, both in contents and workmanship, and the various papers contain much of value to the practitioner.

Seventeenth Report of the State Board of Health of Wisconsin. Paper, 52 pages. Madison: 1897.

The report contains the laws relating to vital statistics, transportation of the dead, adulteration of foods, drugs, bakeries, etc. The secretary, U. O. B. Wingate, M.D., contributes "Some Thoughts Relative to Sanitary Legislation." "Formaldehyde as a Disinfectant" is also considered and a "Report of the Committee of the American Public Health Association on the Cause and Prevention of Diphtheria."

The Vital Statistics of Massachusetts, 1856-95. Paper, 844 pages.

This is from the "Twenty-eighth Annual Report of the State Board of Health of Massachusetts" for 1896 and contains much of value concerning vital statistics and in handy form.

NECROLOGY.

LYMAN T. COLLAR, M.D., Hingham, Wis., October 22, aged 52 years.——Jacob Hay, M.D., York, Pa., October 18, aged 54 years.——John May, M.D., New Holland, Ohio, October 20,

aged 82 years.——A. M. Ross, M.D,, Montreal, October 27, aged 65 years, one of the founders of the Society for the Discussion of Physiologic Knowledge in 1881.——George F. Mather, M.D., Shenandoah, Pa., October 22, aged 57 years.

MISCELLANY.

Bureau of Clinical Medicine and Surgery.—There has been established in Philadelphia, at the northeast corner Thirteenth and Locust Streets, a bureau of clinical medicine and surgery, with telephone connection, in charge of a clerk, whose duty it shall be to receive and post notices of the daily work in the branches of surgery and medicine taking place at the different hospitals. This can be accomplished by notice to the bureau by postal card or telephone. By this means it is hoped that the numerous physicians who visit the city may be able to take advantage of the great clinical facilities afforded by the hospitals of Philadelphia. A physician calling at the central bureau is thus able to ascertain what medical or surgical work may be going on during that day in any one of the different hospitals. Physicians visiting Philadelphia are cordially invited to use these facilities.

The Iodin Reaction in the Blood has a differential value, according to M. Goldberger and S. Weiss, who have demonstrated that it indicates a suppurating process. In case of progressing or active suppuration the leucocytes stain brown with the Ehrlich iodin mucilage test: Iodi subl. 1; potass. iodi., 3; aq. dest., 100; gumm. arab., q. s. ad consist. syrup. The polynuclear neutrophilous cells are almost exclusively affected, and the intensity depends upon the rapidity of the abscess formation. The reaction disappears after incision and as the abscess becomes cold. The test is not reliable when there is concomitant pneumonic infiltration or after prolonged narcosis.—*Wien. Klin. Woch.*, June 24.

Hot Air Cauterization.—Holländer of Berlin applies hot air at 300 degrees C., directly to the skin, in the treatment of lupus, using a small apparatus which he can regulate at will. The effect is not mechanical, like the Paquelin, and there are no contractions in the scar. As the heat is applied the sound tissue contracts in complete ischemia, while the lupus tissue, in which the vessels are destroyed, is unable to contract and thus receives the full effect of the heat. In the scab formation circulation is restored in the sound tissue, while the necrosed lupus tissue is thrown off. He has been successful in many old, chronic cases with patches on the face as large as a hand, and no relapses in the year since, and he recommended at the Moscow Congress this treatment in high terms, with an interesting demonstration, especially in old and extensive cases.

Railway Accidents.—The statistics submitted show that the number of railway employes killed during the year ending June 30, 1896, was 1,861, and number injured was 29,969. These figures indicate an increase of 50 in the number killed and of 4,273 in the number injured, as compared with the preceding year. The number of passengers killed was 181 and the number of passengers injured 2,873, being an increase of 11 in the number killed and of 498 in the number injured. The number of persons other than employes and passengers killed was 4,406 and the number injured 5,845. These figures include casualties to persons reported as trespassers, of whom 3,811 were killed and 4,468 were injured. From summaries showing the ratio of casualties it is found that for every 444 men employed on railways 1 was killed, and for every 28 men employed 1 was injured. A similar comparison as to trainmen shows that 1 trainman was killed for each 152 trainmen employed and that 1 trainman was injured for each 10 trainmen employed. The number of passengers carried for 1 passenger killed was 2,827,474 and the number of passengers carried for one passenger injured was 178,132. As showing in another way the immunity of passengers from accidents, the report gives ratios based upon the number of miles traveled, from which it appears that 72,093,963 passenger-miles were accomplished for every passenger killed and 4,541,945 passenger-miles for every passenger injured.—*Interstate Commerce Com. Report.*

Hospital Abuses in St. Louis.—It has been stated in the *American Journal of Surgery and Gynecology* that 400 well-qualified physicians in St. Louis are practically destitute. A committee from the St. Louis Medical Society appointed to examine into the abuses of medical charity, reported that the dispensary of the St. Louis Medical College is guilty of treating free applicants who are well able to pay. This dispensary treats over 2,000 cases a week. The committee also found that the dispensary of the Missouri Medical College is the greatest offender against the well being of the medical profession and the community in general by treating free a large number of patients who are well able to pay. It is also stated that many of the members of the faculties of these two colleges are upon staffs of hospitals which employ "runners" to increase their business. It is to be hoped that the exposure by this committee will be followed by some changes for the better in the city, which, next to New York, seems to be the greatest sufferer in this regard.

Treatment of Yellow Fever with Chlorin Water.—Dr. A. Simoes announces that he has reduced the mortality from yellow fever to 8 per cent. in his private practice, and 15 per cent. in hospital cases, by treating the disease with chlorin water, for which he claims marvelous virtues. He asserts that it is the best gastro-intestinal disinfectant, not only destroying the germs but rendering the organism an unfavorable soil for their further virulent development or neutralizing the ptomains. It has a marked tonic effect on the heart and kidneys and acts as an astringent and hemostatic, but its principal value is its specific effect on "black vomit," which is arrested by the first doses. He administers a purgative, then sodium salicylate combined with aconite or antipyrin, followed by quinin, resorting to the chlorin water in the second or third stages and supplementing it with artificial serum in certain cases of anuria. *O Brazil Medico* (September 15) comments rather incredulously on this therapeutic apotheosis of chlorin water, mentioning incidentally that Simoes is a zealous convert to Freire's discovery of the microbe of yellow fever.—"Tratamento da febbre amarella pela agua chlorada," Angelo Simoes, M.D., Campinas. Typ. Besnard Freres; 1897, pp. 101.

Elimination of Bacteria through the Kidneys.—The results of former research (Biedl, Kraus, et al.) demonstrated that microorganisms (staph. py. aur., bact. coli, anthrax bac.), introduced into the veins were eliminated through normal kidneys, commencing to appear in the urine in a few minutes. Also that stimulation of the urinary secretion favored the elimination. Klecki confirms the former statement, but in a series of experiments with smaller amounts of cultures than hitherto used, corresponding more to the natural processes, he failed to discover any favorable effect of increased diuresis on the elimination of the bacteria, even with caffein, theobromin, or 500 c.c. normal salt solution. The beneficial effect of salt solution in infections must therefore be due to attenuation and increased elimination of the toxins. He adds that the kidneys only eliminate a fraction of the total number of bacteria; they may still be circulating in the blood after all renal elimination has ceased. —*Wien. klin. Woch.*, August 26.

The Value of Vibratory and Tremolo Massage should be impressed on every practitioner and student, as Gambara remarks in an article on the subject in the *Gazz. degli Osp. e delle Clin.* of August 1. The indications are the same as for electrotherapeutics in all acute or chronic diseases of the nervous and peripheral system, whenever massage could be

applied to advantage. It is remarkable in its curative effect in affections of the ears, of the mucous membrane, nasal, gastric, intestinal, and of the genito-urinary system; also in chronic cutaneous troubles. It is not an empiric treatment, but is based on rational and physiologic grounds, as it acts on the anatomic elements, and promotes the transformations of matter better than any other therapeutic measure, while removing the morbid refuse. He recommends especially Professor Boschetti's small hand apparatus, which transmits a rapid and almost silent rotary movement to an articulated metal rod or flexible cord producing from 4,000 revolutions a minute upward. It can be connected with a gas or electric motor if desired. An eccentric changes the motion from a rotary to a tremolo at will. The rotary or vibratory movement is transmitted to the tissues in parallel planes like waves of sound, and is communicated onward in the same way, while the tremolo affects them like the concentric ripples that spread when a stone is thrown into a quiet pool. The tissues thus feel the effect in every direction, and the massage is much more effective.

A New Centrifuge for Medical Purposes.—There has recently been perfected a centrifugal machine for the rapid examination of urine, blood, sputum, milk, water, etc. The fluids are contained in glass tubes which are rotated horizontally by means of a set of hardened bronze gears having spirally cut teeth. The speeds required vary from 2,000 to 12,000 per minute, hence the spirally cut teeth are a great advantage, as they very materially reduce the friction and noise generated by the rapid rotation and thus increase the speed attainable, also the wearing qualities. The reason for the saving effected, lies in the fact that three teeth always come in contact at once and in a shearing manner, so as to prevent all back lash, etc. The gearing and axles are contained in a circular metal case four inches in diameter and one inch thick. In use the instrument is clamped to the table by a screw clamp. For the precipitation of sediments in urine, the urine is contained in two glass tubes, each having a capacity of 15 c.c. of fluid. One of the tubes is plain and is intended for the collection of sediment for microscopic examination. The other tube has the first 10 c.c. graduated into 100 parts, the 15 c.c. point being also indicated by a graduation. In this tube 10 c.c. of the urine to be examined are placed and 5 c.c. of the proper re-agent to cause the precipitation of the substance which it is desired to determine, is then added. After centrifugation, the substance (chlorids, phosphates, sulphates, albumin, etc.) will be found collected in the distal end of the tube and the per cent. may be read direct from the scale. A neat manual of "Centrifugal Analysis" minutely describing the various methods employed in the examination of blood, urine, sputum, milk, water, etc., is sent free upon request by the Bausch & Lomb Optical Co., Rochester, N. Y.

How to Maintain the Balance of Nitrogen in Nephritis.—In an article in the *Gaz. d. Osp e d. Clin.*, July 25, Prof. E. Maragliano emphasizes the importance of resting the kidneys by reducing the nitrogenous substances ingested, to the lowest amount compatible with non-consumption of the organic tissues. Many have endeavored to determine this minimum, but their failures should not discredit the principle, which is vital. He has solved the problem by individualizing, with careful tests. He begins by limiting the patient to a half liter of milk a day. If the amount of nitrogen eliminated is more than the amount that corresponds to the albuminoids ingested, which is usually the case, it signifies that there has been consumption of organic albuminoids. The quantity of milk allowed should then be increased to add the amount of albumin corresponding to the excess in the nitrogen eliminated. Five days at least, are required for the test, passing from a richer to a poorer alimentation, but two or three are enough when the change is from a poorer to a richer. He supplies the necessary amount of calories (considering 25 calories per kilog. a low average), by adding sugar and rice cooked in milk or in water with fat in the sauce. Every effort must be made to keep the nitrogen ingested within the limits indicated by the test. This minimum represents the maximum of rest that can be conceded to the kidney; it can not be mathematically fixed, but varies from time to time, requires a repetition of the test at least once a month, with daily determination of the density of the urine as a slight guide in the meantime. It is wise to note the fecal with the urinary elimination, but when not practicable it can be approximated by remembering that in normal persons it varies from one-half to one and one-half in twenty-four hours, and the larger amount is more apt to be correct in nephritis. In all acute cases of nephritis the physician will not err if, even without testing, he limits the patient to one-half to one liter of milk a day with 200 grams of rice and 25 to 50 grams of sugar until the acute stage is past. In addition to the above, Maragliano restricts the diet one day in every eight, to a scant liter of milk, and has the patient drink one and if possible two liters of alkalin mineral water, obtaining by this means the combustion of accumulated nitrogenous residue and its elimination, and obviating auto-intoxication, which is usually the cause of death in nephritis.

Infection Through the Air.—C. Flügge reports (*Ztft. j. Hyg. u. Infect.*, Vol. 25, No. 1), the results of much research in regard to the transmission of germs through the air. Dust from matter containing bacteria always consists partially of fragments so minute that they float in the air of a quiet room for more than four hours, and the slightest current of air will waft them about. He also states that tiny drops of moisture containing bacteria pass into the air even in closed rooms from the ordinary manipulations and float for five hours, and are transported by a current no stronger than 0.07 m.m. for a horizontal draught or 0.1 m.m. for an upward current. The dissemination of these transportable drops is of great importance in regard to the secretions of the mouth and nose, especially in case of tuberculosis, influenza, diphtheria, etc. He found by repeated tests that plates of agar become covered with colonies of bacteria at a distance of several yards, from persons speaking loudly and energetically. Coughing produced a still more rapid and abundant colonization, while the plates showed no growth when the person spoke low and quietly. He does not consider dry particles floating as dry dust in the air a serious menace for the infection of wounds during operations, as the staphylococcus aureus and albus in these conditions are not sufficiently virulent to colonize agar plates; all his experiments in this line were negative. But he emphasizes the danger to be apprehended from the drops of moisture disseminated from the secretions of the mouth and nose of the persons present at the operation, as they speak, sneeze or cough. The pyogenic bacteria are frequently found in the mouth of perfectly healthy persons, and decayed teeth are a mine of all sorts of bacteria. These microbes have not been attenuated by drying, but are moist and often extremely virulent. Distance from the operating table does not prevent the germ-laden drops of moisture from reaching the patient or some following case or alighting on the instruments. The patient himself may infect the field by heavy breathing, etc. Mikulicz's "Transcendental Surgery," described page 201 of the JOURNAL (gloves and mouth screens), was inspired principally by these experiments of Flügge, with which he was familiar.—*Cbl. f. Chir.*, October 2.

The Dixon Case.—The decision of the Illinois supreme court in the Dixon case will be disappointing in the extreme, but as it is held to be law, we suppose we will have to make the best of it until the statutes shall afford relief. In the supreme court of Illinois a decision was handed down which is of great interest to physicians and others who may be called upon to give expert

testimony in court. It is held by many professional men that they can not be compelled to give a professional opinion without a reasonable compensation, and in support of this they quote that portion of the constitution which declares that no person shall be deprived of property without due process of law. The case in which the decision was handed down is an appeal of Dr. J. Norman Dixon from a judgment rendered against him by Judge Creighton, of the Sangamon circuit court, some time ago, in which it was agreed a test should be made. Dr. Dixon was called to give expert testimony in a damage suit for personal injury against the city of Springfield. He refused to testify unless he was paid a professional fee of $10. Judge Creighton fined him $25 for contempt of court and the case was appealed to the appellate court, where Judge Creighton's judgment was affirmed. The case then went to the supreme court, where the judgment was again affirmed. The briefs in the case were prepared by State's Attorney James M. Graham, and the ground taken was that professional knowledge of the kind required in expert testimony is not properly within the meaning of the constitutional provision, as it can not be given away nor alienated from the person possessing it, and that in the exercise of the right of the court to summon witnesses and compel them to testify no distinction can be made between kinds of knowledge without endangering the ends of justice. This view of the case was upheld by the appellate court, and now the supreme court affirms it. Judge Creighton's decision attracted general attention when it was announced and called forth the strongest condemnation from members of the medical profession. However, he is now upheld by the highest judicial tribunal in the State.

Deaths from Gangrenous Varicella.—An annotation in the London *Lancet* for October 9, adverts to two fatal cases of varicella that have been reported by two American physicians in the *Archives of Pediatrics*, September; one case having been described by Dr. Silver of New York City and the second by Dr. Lockwood of Baltimore. The case of the latter was a well-nourished female child two years of age which when first seen exhibited a well-marked varicellous eruption. On the next day a wide zone of dusky red dermatitis occupied nearly the whole surface of the trunk. Rapid ulceration of the spots within this area ensued. The contents of many of the vesicles became hemorrhagic. Bleeding from the mouth and nose occurred and blood was extravasated in the skin over the pubes and about the genitals. The gangrenous spots varied in depth, and in size from a pea to a surface measuring one inch by two inches. They often occurred where there were no varicella vesicles. On the trunk were large patches where the epidermis only was removed, exposing purplish dry surfaces. These were due to the dermatitis, and did not radiate from the chicken-pox vesicles. The deeper spots showed a dry, hard, black eschar in the center, an ulcerating border, and an elevated inflamed edge. The left eye was closed from swelling and ulceration of the upper lid, and there was free purulent discharge from between the lids. The child emitted an extremely fetid odor. Death took place on the eighth day, apparently from bronchopneumonia; but satisfactory examination of the chest was not possible. The other case was that of a boy in good health, two years of age. The illness began with diarrhea, which was followed by a temperature of 103 degrees F., lethargy, and a convulsion. On the fourth day the body was covered with the characteristic rash of varicella. The mucous membranes of the mouth and conjunctiva were congested. On the third day of the eruption circles of congestion from one-fourth to one-half inch in width were noticed around several of the spots, which had become black and depressed in the center. Next day three gangrenous areas, measuring from one to two and one half inches across, appeared on the neck. On the following day both eyelids were so much swollen that they could not be opened and there was a profuse discharge of blood and serum from the mouth and nose. The urine contained abundant albumin and numerous granular casts. The child died in the evening soon after a convulsion. It is curious that varicella, the mildest of all the infectious diseases, should present such a grave complication. Mr. Hutchinson, who first described the disease, attributed the occurrence of the gangrene to idiosyncrasy, as it usually occurred in healthy children. Mr. Barlow, however, denies this and asserts that in none of his cases were the children healthy. A second infection by some microbe supervening on the varicella has also been offered as an explanation, but evidence on this point is wanting.

The Chemistry of Bacterial Disinfection.—The *Cbl. f. Chir.* (October 20) reviews the recent important work of B. Krönig and T. Paul in this line. They state that: 1. Comparative tests should be made with equimolecular quantities, as a "percentage" is unreliable in precise research. Among their conclusions we note that the disinfecting power of solutions of the metallic salts depends on the specific properties of the salts and of the dissolving medium as well as on the concentration of the metal. 2. The effect of the halogenous combinations of mercury varies in proportion to their degree of dissociation. 3. The disinfecting power of aqueous solutions of mercuric chlorid is diminished by the addition of the halogenous combinations of the metals and hydrochloric acid, probably due to the retarded electrolytic dissociation. 4. The disinfecting power of mercuric nitrate, mercuric sulphate and mercuric acetate is materially increased by the addition of a moderate amount of sodium chlorid. 5. Acids disinfect in proportion to their electrolytic dissociation, that is, in proportion to the concentration of the hydrogen ions contained in the solution. 6. The bases, potassium, sodium, lithium and ammonium hydroxyds disinfect in proportion to the concentration of the hydroxyl ions contained in the solution. Hydrogen ions are more powerfully toxic for anthrax spores and the staph. pyog. aur. than hydroxyl ions at the same concentration. 7. The disinfecting power of the halogens, chlorin, bromin, iodin, decreases in proportion to increasing atomic weight. 8. Nitric acid, dichromic acid, chloric acid, hypersulphate and permanganate disinfect in proportion to their rank in the series of oxidating elements arranged according to their electric properties. Chlorin has a very strong specific disinfecting effect. 9. The disinfecting power of various oxidating elements is materially increased by the addition of halogen-hydrogen-acids, such as hydrochloric acid added to potassium permanganate. 10. Their experiments confirm Scheurlen's announcement that solutions of phenol disinfect better when salts are added. Also that substances dissolved in alcohol, methyl alcohol and ethyl ether have scarcely any effect upon anthrax spores. 11. The disinfecting power of aqueous solutions of silver nitrate and mercuric chlorid is materially increased by the addition of certain definite amounts of ethyl alcohol (50 per cent. for arg. nitric.; 25 per cent. for sublimate), methyl alcohol and acetone. 12. The disinfecting power of aqueous solutions of phenol and formaldehyde decreases with any addition of ethyl or methyl alcohol. Bouillon, gelatin, organic fluids, also diminish the disinfecting power of aqueous solutions of the metallic salts. 13. Conclusions in regard to the power to prevent the development of bacteria drawn from bactericidal power of a substance are unreliable.

Societies.

The following meetings are noted:

Connecticut.—New Haven County Medical Association, New Haven, October 21.

Indiana.—Vanderburgh Medical Society, Evansville, October 19.

Kansas.—Eastern Kansas Medical Society, Bonner Springs October 30.

Maryland.—Baltimore County Medical Association, Towson, October 21.

New York.—Binghamton Academy of Medicine, October 19; Medico-Legal Society, New York City, October 20.

Ohio.—Cleveland Medical Society, October 22; Lorain County Medical Society, Lorain, October 26. Northern Ohio District Medical Society, Sandusky, October 28.

Wisconsin.—Fox River Valley Medical Society, Oshkosh, October 16.

Washington.

HEALTH OF THE DISTRICT.—The report of Health Officer Woodward, for the week ended October 23, shows the total number of deaths to have been 91, of which number 51 were white and 40 colored. Among the principal causes of death were 12 of the nervous system, 7 of circulatory; 19 from consumption. There were 2 fatal cases of typhoid fever and 2 of diphtheria.

MEDICAL SOCIETY.—At the meeting of the Medical Society, held on October 27, a number of cases and specimens were presented, as follows: Dr. Allen, fibrinous bronchitis; Dr. Walter Reed, splenic leukemia; Dr. Tompkins, tumor of the cerebellum; Dr. Behrend, sarcoma of the uterus, and Dr. Acker, specimens from general tuberculosis.

Detroit.

WAYNE COUNTY MEDICAL SOCIETY.—At the regular meeting of this Society, October 21, Hal C. Wyman, M.D., read a paper on the subject of "Appendicitis." His theory of its etiology is that it is caused by a special bacillus which accepts the soil of the appendix for its ravages, as certain bacilli accept certain localities and produce typic diseases, for example, the typhoid bacilli, which attack Peyer's patches, etc. The inflammation of the appendix begins in the mucosa and may end there, or the disease may go on to inflammation with its necessarily serious results, indicated by an increase of pain, tenderness and rigidity of the region involved. Symptoms have been known to be absent until death was imminent, therefore early operation is indicated. The case often comes too late to the surgeon. As a rule it is the complication which kills the patient, and not simply the sloughing appendix. The most serious complication is obstruction of the bowel. It is a fact that no death occurs from appendicitis in which there is not an obstruction of the bowel. This complication should be treated by an enterostomy. Loss of heat to the body of the patient from prolonged operation is another serious complication which should be combated by the application of dry heat to the trunk. The practice of applying towels wrung out of hot water to the exposed intestine is harmful, for the reason that the water so applied evaporates rapidly and so causes a rapid loss of heat. Diagnosis is easy and simple. When in doubt, and the patient's condition is serious, incision should be made to find cause.

CHANGE OF ADDRESS.

Borck, E., from St. Louis, Mo., to Red Bud, Ill.
Cole, A. M., from 173 North Pa. Avenue to 24 East Ohio, Indianapolis, Ind.; Calvin, J. P., from New Castle to Eureka, Ala.; Craig, W. H., from Glendora to North Ontario, Cal.
Eastman, C. A., from Exeter, N. H., ro Danvers, Mass.
Frank, J., from Ozark, to Carondelet, Ill.; Foreman, J. M., from 4128 Easton Avenue to 3867 Easton Avenue, St Louis, Mo.; Fletcher, W. B., from 748 Fletcher Avenue to 218 North Avenue, Indianapolis, Ind.
Holinger, J., from 1373 N. Clark Street, to 314 Sedgwick Street, Chicago, Ill.; Harmison, D. C., from Bath to Havana, Ill.
Jump, E. D., 1251 So. 47th Street to 4634 Chester Avenue, Philadelphia.
Hackett, J. C., from Le Mars, Iowa, to Lacygne, Kan.
Kirkpatrick, T., from Topeka to Garnett, Kan.; Kilbride, J. S., from Dawson, Minn., to Emmetsburg, Iowa.
Lockwood, W. D., from Columbia to Stockyards, Mo.
Munn, W. P., from 709 14th Street to 2801 Colfax Avenue E., Denver, Colo.
Naughton, M. T., from 4332 Indiana Avenue to 4725 Ashland Avenue, Chicago, Ill.
O'Reilly, P. S., from 2829 Lucas Avenue, to 2839 Lucas Avenue, St. Louis, Mo.
Ramsey, R. T., from Danville to London, Ky.
Tiffin, A. J., from Harris to Maynard, Minn.; Thomas, F. W., from Marion, Ohio, to Denver, Colo.

Let us have a Department of Public Health!

LETTERS RECEIVED.

Anderson, W. E., Pensacola, Fla.; Arlington Chem. Co., Yonkers, N.Y.
Burton, Jas. S., White, Tenn.; Bucke, R. M., London, Ontario, Cana.; Bergey, D. H., Philadelphia, Pa.; Beard, R. O., Minneapolis, Minn.; Blair, G. Heninston, Boothbay Harbor, Me.
Champion, J. H., Portsmouth, Ohio; Clarke, Augustus P., Cambridge, Mass.
Davis, Chas. Gilbert, Chicago, Ill.; Dial, W. H., Laurens, S. C.
Elliott, H. G., New York, N. Y.; Edenbo, D. H., South Bend, Ind.
Fox, Horace, Bath, Me.
Greeley, James T., Nashua, N. H.
Harris, E. Eliot, New York, N. Y.; Hardon, C. H., Pomona, Cal.; Hummel, A. L., Advertising Agency, New York, N. Y.; Hughes, C. H., St. Louis, Mo.; Herdman, W. J., Ann Arbor, Mich.
Lewis, H. K., London, Eng.; Leutz, Chas. & Sons, Philadelphia, Pa.; Lehn & Fink, New York, N. Y.
Mitchell, H. F., South Bend, Ind.; Manley, Thomas H., New York; Morehouse, George W., Sparta, O.
Potter, S. O. L., San Francisco, Cal.
Richardson, A. R., Chicago, Ill.
Stoneberger, Mrs. Mabel R., San Francisco, Cal.; Shepard, Charles H., Brooklyn, N. Y.
Tipton, W. R., Las Vegas, N. M.
Wingate, U. O. B., Milwaukee, Wis.; Weeks, S. H., Portland, Me.; Wilson, A. R., Atlanta, Mich.; Wood, William & Co. New York, N. Y.; Wood, W. F., Mishawaka, Ind.

PAMPHLETS RECEIVED.

Acquired Umbilical Hernia in Adults; Comparative Frequency of Stone in the Bladder in the White and Negro Races; Splitting the Kidney Capsule for the Relief of Nephralgia; Symptoms and Treatment of Hepatic Abscess with Report of Seventeen Cases; Value to the Public of State Medical Societies. By Geo. Ben. Johnston, Richmond, Va. Reprints.

Amytrophic Lateral Sclerosis. By J. M. Aikin. Reprinted from Western Medical Review.

Clinical Report on the Course of Pregnancy and Labor as Influenced by Suspensio uteri; Contribution to the Technique of Operations for the Cure of Laceration of the Pelvic Floor in Women; Development and Present Status of Hysterectomy for Fibromyomata; Ectropion of the Cervix in Nulliparæ Resembling Laceration of the Cervix; New Method of Suturing the Abdominal Wall in Celiotomy; Remarks on the use of the Buried Permanent Suture in Abdominal Surgery; Some Further Observations concerning Movable Kidney; Vaginal Incision and Drainage of Suppurating Hematoceles due to Ectopic Gestations. By Charles P. Noble, Philadelphia.

Criminal Abortion. Its Prevalence, its Prevention, and its Relation to the Medical Examiner. Based on the . . . . vital statistics of the New England States for the year 1892. . . . . By H. R. Storer. Paper. 34 pages. Reprinted from Atlantic Medical Weekly.

Credé's Method for the Prevention of Purulent Ophthalmia of Infancy in Public Institutions; Legislation in the United States for the Prevention of Blindness. By Lucien Howe, Buffalo. Reprints.

Early Diagnosis and Mistaken Diagnosis in Cases of Tumor of the Breast; A Preliminary Comparison of Methods and Results in Operative Surgery at the Sea Level (N. Y.) and in places of High Altitude (Denver). By Charles A. Powers, Denver. Reprints.

Eine neue Methode der Hysteropexie; Pylorectomy for Carcinoma; Ueber der Wert der Castration bei Prostata-Hypertrophie. By Carl Beck, New York. Reprints.

Joseph Freiderich Peringer; His Methods and Investigations. By Harry Friedenwald. Reprinted from Johns Hopkins Hospital Bulletin.

Notes on the Pathology and Bacteriology of Appendicitis. By Charles F. Craig. Paper. 12 pages. Illustrated. Reprinted from New England Medical Monthly.

Prognosis in the Treatment of Hemiplegia. By Charles H. Lodor. Reprinted from Medicine.

Relation of Diseases of the Skin to General Conditions. By L. Duncan Bulkley. Paper. 20 pages. Reprinted from Jour. Am. Med. Asso'n.

Report of a Case of Intradural Spinal Tumor Extending Through the Foramen Magnum. . . . By J. T. Eskridge. Paper. 20 pages. Illustrated. Reprinted from Medical News.

Report of the Kensington Hospital for Women, Paper. 28 pages. Illustrated. Philadelphia.

Report of Two Cases of Syphilis with Remarks Relative to Ptyalism. By C. Travis Drennen. Reprinted from Medical News.

Report on the use of a Mixture of Castor Oil and Balsam of Peru as a Surgical Dressing. By A. Ernest Gallant. Paper. 12 pages. Reprinted from Annals of Surgery.

Some Common Poisonous Plants. By V. K. Chesnut. Paper. 12 pages. Illustrated. Reprinted from "Year-book of the Department of Agriculture" for 1896.

Stone in the Kidney. By Charles R. Robins. Paper. 16 pages. Reprinted from Va. Med. Semi-monthly.

Urinary Antiseptics in Cystitis. By Arthur R. Elliott. Paper 8 pages. Reprinted from No. Am. Practitioner.

Yeast Nucleinic Acid in the Treatment of Septicemia, with Report of Cases. By Walter Courtney. Paper. 24 pages. Reprinted from Medical News.

THE PUBLIC SERVICE.

Army Changes. Official List of Changes in the Stations and duties of officers serving in the Medical Department, U. S. Army, from October 9 to 15, 1897.

First-Lieut. Thomas J. Kirkpatrick, Jr., Asst. Surgeon U. S. A., is granted thirty days' extension to leave of absence.

Major W. C. Shannon, Surgeon U. S. A., sick leave of absence further extended six months.

Lieut.-Col. Charles Smart, Deputy Surgeon-General U. S. A., and Capt. William H. Arthur, Asst. Surgeon U. S. A. are detailed to represent the Medical Department of the Army at the twenty-fifth annual meeting of the American Public Health Association, to meet at Philadelphia, Pa., Oct. 26 to 29, 1897.

Major Alfred C. Girard, Surgeon U. S. A., is detailed to represent the Government of the United States at the Ninth International Congress of Hygiene and Demography, to be held at Madrid, Spain, April 10 to 17, 1898.